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AN
ATLAS OF PLATES
ILLUSTRATIVE OF
THE PRINCIPLES AND PRACTICE
OF
OBSTETRIC MEDICINE AND SURGERY.

WITH DESCRIPTIVE LETTER PRESS.

BY

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P R E F A C E.

SHOULD any apology be deemed necessary for obtruding on the medical public a new work on obstetric science, it may, perhaps, be furnished by the interest which that department of medicine has acquired of late years, and the attention it now commands from the profession. The numerous valuable publications on the subject that have recently issued from the press, forcibly demonstrate the high position it has attained as a part of medical studies; and it is confidently hoped that the present addition to the stock of obstetric literature, drawn up on a somewhat novel plan, will not be considered altogether superfluous.

This branch of physic, indeed, has struggled against far greater difficulties than have beset the general practice of medicine and surgery; for both ignorance and prejudice have lent their aid towards retarding its advancement. On the one hand it has had to contend with the natural prejudices that females themselves must entertain against admitting a person of the opposite sex to undertake the duties required under the trying time of labour; and on the other, with the erroneous belief that parturition, being a natural action, would be accomplished in woman with equal facility and safety as in the brute creation. Arguments, sufficiently strong and numerous,

could be adduced to prove the fallacy of the latter assumption, but they are foreign to our immediate purpose. And although the change has been effected but slowly, the prejudice existing in the female breast has now, happily for them, given way to a sense of the security they enjoy in placing themselves under the superintendence of well-educated surgeons.

The continental universities took the lead in enrolling *midwifery*, as it is called, among their obligatory studies; and most of the British institutions of a like nature have tardily followed in their steps. It cannot be necessary to enforce by reasoning the propriety of the regulations they have adopted; but whatever circumstances may have impelled them to such decisions, cannot be devoid of interest, and are therefore worthy of being recorded.

As far as the London corporations are concerned, much may be attributed to the exertions of a society established in 1826, under the title of the Obstetric Society of London. This body consisted of about thirty members, embracing, with the exception of two or three, all the then present and late lecturers on obstetric medicine in London, besides a few other practitioners; and the editor of this work acted as honorary secretary. The object of the society was to place the practice of obstetric medicine on a more respectable footing than it had hitherto enjoyed. It was proposed to accomplish this by inducing the Colleges of Physicians and Surgeons of this city to abrogate their by-laws, which precluded practitioners in "midwifery" from the fellowship of the one, and a seat at the council-board of the other; and by requiring the College of Surgeons, and Society of Apothecaries, not only to make obstetric science the subject of examination, but to oblige all candidates who offered themselves for their diploma to adduce testimonials of having diligently applied themselves to its study.

A lengthened correspondence passed between the committee and the secretary of state for the home department, as also with the London medical corporations. Sir Robert Peel, at that time at the head of the Home Office, entered warmly into the question, honoured a deputation of the society with an interview, put himself in communication with the medical corporations on the subject of the memorials addressed to him, and allowed a great part of the correspondence which passed between them and the society to be transmitted through his office.

All the objects which the society proposed have since been carried into effect, except the change in the constitution of the council of the College of Surgeons; and thus, to the perseverance of a very few members of the profession may justly be attributed the adoption of measures fraught with the highest possible advantage to the community, inasmuch as they tend to enhance the acquirements of the great mass of English practitioners.



OBSTETRIC MEDICINE AND SURGERY.

OF THE PELVIS.

BEFORE the mechanism of parturition can be understood, it is necessary to describe the organs subservient to the process, and with this view the bony pelvis first offers itself to the attention.

The term *pelvis* is applied to that mass of bones which, placed at the bottom of the spinal column, and resting on the inferior extremities, connects the thighs with the upper part of the trunk. When divested of its soft structures, this organ somewhat resembles a basin, and hence its name; for the Greeks called it *πέλυσ*, a wooden utensil of bowl-form, used for domestic purposes; the Latins from them derived the word *pelvis*, which we have adopted. In many of the older anatomical works it is described as “the basin,” but all the recent authors have preferred the more classical appellation of *pelvis*.

Division of the bones of the pelvis.—In the adult state it is composed of four bones, two *ossa innominata*, which form the parietes at the side and in the front; the *os sacrum* and the *os coxygis*, which bound the cavity behind. But until the age of childhood is considerably advanced, many points of ossification are observed in each of these bones, separated by intervening portions of cartilage;

these cartilaginous septa are gradually absorbed as growth advances, and ossific matter is deposited in their stead; so that one solid bone is formed of what originally consisted of many pieces.

This arrangement is particularly remarkable in the os INNOMINATUM,* which during the period of infancy is divided into three distinct parts. In describing the os innominatum, therefore, anatomists have preserved the distinction of these separate bones, marked out in early life; and demonstrate it as though it still consisted of the three original portions. To the superior division they give the name of *os ilium*;¹ to the inferior that of *os ischium*;² and to the anterior that of *os pubis*.³



The white lines in the accompanying cut, drawn from the os innominatum of the left side, distinguish with suffi-

* This bone is generally said to have obtained its name from its shape being so irregular that it could not be likened to any object in nature. (Quain, Campbell, and others.) It is more probable, however, that it originated in the fact, that no specific term was applied to it for long after it had been described in medical writings. Its three constituent parts had each a special designation, but when they grew together, the entire piece was left nameless.

cient clearness the natural division of the bone in the young subject.

The two next cuts represent the left os innominatum of the adult. The first gives a view of the outer, the second of the inner surface.

The Os ILIUM, HIP or HAUNCH BONE, is the largest of the three divisions of the os innominatum; and it is uppermost in position. It is remarkable for some peculiarities, which, in an obstetrical point of view, as well as anatomically, are worthy of consideration. It has an outer and



Hippocrates, indeed, (De Articulis, lib. iii. cap. 41,) speaks of it as *μεγὰς σπονδύλος*, "the great vertebra," very incorrectly; for although Monro states that by this phrase Hippocrates signified the sacrum, any one who reads the passage 'Απο μέν του ἱεροῦ ὀστέου ἄχρι του μεγάλου σπονδύλου παρα ὧν προσηρτῆται τῶν σκελῶν ἢ προσφύσις, &c., "but from the sacrum, as far as the *μεγὰς σπονδύλος*, into which the thigh-bones are articulated," must be satisfied he meant by it the os innominatum. Celsus (lib. viii. cap. 1) calls it the os coxarum, which defines nothing; but after him we find Galen (com. in Hip. lib. de ossium natura, cap. 20) using the following words in respect to these two bones, *μηδὲν ἔφ' ὧλων ἑαυτῶν ὄνομα κείμενον ἔχοντα*, although their different component parts, the ilium, ischium, and pubes, had each a distinct title; yet *no name had been allotted to them as a whole*. It therefore obtained the contradictory appellation os innominatum, or bone without a name.

an inner surface; the outer is called *dorsum*,^a and may be said to be irregularly convex: it is marked by eminences and depressions indicative of the attachment of the three powerful *glutæi* muscles. The chief extent of the inner surface is concave and smooth, and is called the *venter*. The lower portion, the base or body, is the thickest part of the bone, and enters largely into the composition of the *acetabulum*,^b a cavity for the reception of the head of the femur,—in conjunction with which it forms the hip-joint. Just above the base the bone narrows into a kind of neck, from which springs the *ala* or *wing*,^a rising obliquely upwards, outwards, backwards, and forwards, to protect and support the lower abdominal viscera. The *ala* terminates superiorly in a ridge, running along its whole extent, called the *crista ilii*, *crest* or *spine* of the *ilium*.^c This ridge is tipped with a deep layer of cartilage in the child, as is shown in the first cut. To different parts of the crest are attached the oblique and transverse abdominal muscles, the *latissimus dorsi*, the *erector spinæ*, and the *quadratus lumborum*. The *crista ilii* ends both anteriorly and posteriorly in a jutting prominence, to which the term *spinous process* is applied; beneath each of these prominences there is a slight sinuosity; and below them, again, another jutting point of bone, also called *spinous process*: so that there are four *spinous processes* belonging to the *ilium*; an anterior superior,^d an anterior inferior,^e a posterior superior,^f and a posterior inferior.^g From the anterior, powerful muscles take their origin. The anterior superior *spinous process* gives attachment to one end of Poupert's or Gimbernat's ligament; to the *tensor vaginæ femoris*, and the *sartorius* muscles. From the anterior inferior arises the longer portion of the *rectus femoris*. Into the posterior are inserted strong ligaments, which bind this bone most firmly to the sacrum. Below the posterior inferior *spinous process* there is a considerable sinuosity or arch,^h forming,

when the bone is joined to the sacrum, a very large notch: this is called the sciatic notch. But in the recent pelvis this notch is perfected into two foramina—an upper one, the larger, and a lower one, the smaller—by ligaments, hereafter to be described, which run from the side to the back part of the pelvis; and therefore, when the ligaments are preserved, their apertures are called the sciatic foramina. (Plates 2 and 4, fig. 2.) Through the larger of these pass the gluteal, sciatic, and pudic arteries; the sciatic and pudic nerves, and the pyriform muscle. Through the smaller the pudic arteries and nerve re-enter the pelvis, and the obturator int. muscle passes out.



That portion of the internal face of the ilium, which is smooth and concave,^k supplies a bed for the reception of the iliacus internus muscle; but the posterior part^l is very rough, and marks the connexion between the ilium and the sacrum. This union forms one of the two *sacro-iliac symphyses*, or posterior joints of the pelvis, there being one on

each side of the sacrum. Between the ilium and sacrum, at this junction, is interposed a piece of fibro-cartilage, about a sixth or eighth of an inch in thickness, so that the bones are separated to that extent; and it is invariably remarked, provided the joint is healthy, that, when the ligaments are cut, and the two bones forcibly wrenched asunder after death, the cartilage adheres to the sacrum, leaving the ilium denuded. In structure it is more like the intervertebral substance than any other tissue of the body: it is arranged in concentric layers, and is softer towards its posterior edge than in the front. The object of this soft elastic pad being situated in this place is evidently to break the shock, and prevent the jarring sensation which must otherwise have been experienced, in the violent actions of the body, such as running and leaping; and it may also act as a cement in glueing the bones together. Traversing the inner surface horizontally, there is a ridge, which divides the ala from the lower part,^m and which is more evident in the entire pelvis, forming a portion of the *pelvic brim*, *linea innominata*, or *linea ilio-pectinea*. (Plate 3, fig. 1.)

The ilium is connected to the ischium and pubes in the acetabulum, and to the sacrum by means of the sacro-iliac symphysis.

Second in size and lowest in position of the three divisions of the os innominatum, is the Os ISCHIUM, Os SEDENTARIUM, or SEAT BONE, so called from being that portion of the bone on which we rest when sitting. It is remarkable for a *base* or *body*, a *spinous process*, its *tuberosity*, and *ascending ramus*. The base is the thickest part, and assists even more largely than the base of the ilium in the formation of the acetabulum. Immediately below the base there is a narrowed portion that may be called the *neck*, and arising from the posterior part of the neck, jutting backwards and inwards, there is a thin pyramidal

process, somewhat like the point of a lancet, to which the appellation of *spinous process*ⁿ is given. This affords attachment to one fasciculus of the sacro-sciatic or sacro-ischiatric ligaments, and gives origin to the coxygeus muscle, which is inserted into the coxyx, to raise that bone. This spinous process is an object of more intense interest to the obstetrician than its small size would lead us to suppose; because it is sometimes of undue length, or is bent too much inwardly. By such a construction, the capacity of the outlet is materially encroached upon and diminished, and, in a proportionate degree, the passage of the child's head in labour is retarded. In its descent downwards from the neck, the bone bulges out into a considerable protuberance, the *tuber ischii*, or *tuberosity of the ischium*; and, rising obliquely upwards, forwards, and inwards, a flat, narrow sheet of bone extends, to meet a similar piece of bone sent down from the pubes,—the *ramus of the ischium*.^p This bone is also rough externally and smooth within: to the lowest part of the tuber is attached one end of the other fasciculus of the sacro-sciatic ligament; whilst the outer portion gives origin to the semi-membranosus, semi-tendinosus, the long head of the biceps flexor cruris, and quadratus femoris muscles. The ischium is connected to the ilium and pubes in the acetabulum: it is firmly connected also to the sacrum; not by direct junction or bony union, but by means of the ligaments just mentioned.

The smallest of the three divisions of the os innominatum is the OS PUBIS, PECTEN, OR SHARE BONE, situated anteriorly. It, like the ilium and ischium, possesses a *base* or *body*; it has two rami, a *horizontal* and a *descending ramus*, a *spinous process*, and a *symphysis*. The base is its thickest part, and contributes but in a small proportion to form the acetabulum. Just anterior to the base there is a contracted part, the neck, and running horizontally

forwards and inwards, so as to meet its fellow of the opposite side, a thin, narrowed piece of bone is thrown out—the *horizontal ramus* of the pubes.^a This terminates in a wider sheet, and its edge, the point of junction with its fellow bone, is called the *symphysis pubis*:^r it is the anterior joint of the pelvis. The pubic bones are not, however, in contact here; for there is a considerable thickness of the same kind of cartilaginous matter placed between them as is found at the sacro-iliac symphyses. Some anatomists have affirmed that there is a double joint, one on each side of the central cartilage; others, that there is only one; and others, again, that although occasionally an imperfect synovial membrane may be seen, by far most frequently neither can a cavity be detected, nor any apparatus indicative of the presence of a joint: and this latter seems to be the idea of the best anatomists of the present day. From the thickness of the interposed substance, a slight lateral motion may possibly be allowed to the bones, even in the healthy state of the parts; but the strength of the ligaments, both within and without, would prevent any considerable movement. Proceeding from the symphysis, in a direction downwards, outwards, and rather backwards, to be joined by ossific union with the *ramus ischii*, there is another flat, thin, and narrow sheet of bone—the *descending ramus of the pubes*.^s This bone is, like the other two, rough externally, and smooth within: from the outer surface some of the adductor muscles of the thigh take their rise. On the interior, running along the upper margin of the horizontal ramus, there is a ridge, sometimes rather sharp, which is a part of the brim of the pelvis, and at its inner extremity it terminates in a little eminence—the *spinous process*.^t To this is attached the pubic end of Poupart's ligament, near it the pectineus; the oblique and transverse muscles, the pyramidalis, and rectus abdominis, are also inserted

into different portions of the upper edge of the pubes. The pubes is connected with the ilium and ischium in the acetabulum, with the ischium at the junction of their rami, and with its fellow bone of the opposite side by the symphysis.*

When the os innominatum is again regarded as a whole, the attention cannot fail to be arrested by a large oval aperture in the fore part, formed by the ischium and pubes—the *thyroid* or *obturator foramen*.^u In the recent pelvis it is almost entirely filled up by the obturator ligament, which consists merely of two layers of periosteum, one externally, the other within, continued from the bone across it. The space is entirely covered by this extension of the periosteum, except at the uppermost part, where a hole is left, not larger than would permit the passage of a small bougie: through it the obturator vessels and nerve escape from the pelvis. This ligament supplies the place of bone; for the obturator externus, one of the rotators of the thigh, arises from its outer surface. It appears to be placed here for the purpose of rendering this part of the body lighter than it would be, were a thick piece of bone present instead.

There is another point, in regard to these three divisions of the os innominatum, worthy the consideration of the obstetrician; namely, the relation which each bears to those parts of the pelvis, hereafter to be more particularly described,—the brim and outlet. The ilium forms a considerable share of the brim, but none of the outlet; the ischium forms a part of the outlet, but none of the brim; while the pubes enters very largely into the composition of both the brim and outlet: so that the ilium

* The term *pubes* was applied to this bone in consequence of its intimate connexion with the external organs of generation; and that of *pecten* from its fancied resemblance to a comb, when the two are united.

might be greatly deformed, and yet the brim alone suffer ; a distorted ischium would only involve the outlet ; but if the pubes were of vicious formation, both brim and outlet must necessarily be implicated.

The pelvic cavity is bounded posteriorly by the *os sacrum*, *os basilare*, or *rump bone*, and the *os coxygis*, which are also called the *false vertebræ*.

The *OS SACRUM*,* *OS BASILARE*, is the largest bone in the vertebral column : in form it is triangular, the apex of the pyramid being placed downwards, and rather backwards, the base upwards, and inclined a little forwards. Its specific gravity is small ; indeed, it is the lightest bone in the body for its size, and, consequently, rather spongy in structure. It possesses four surfaces—an external, an internal, and two lateral. The accompanying



* The origin of the name *sacrum*, as applied to this bone, has given rise to much conjecture ; and although it has occupied the attention of many learned men, it is still involved in obscurity. That it was of very ancient date, is evident from the term *ἱερον ὄστέον*, used by the Greeks, even prior to the time of Hippocrates.

By some moderns, as Fyfe and Campbell, it is supposed to have been adopted from this particular bone, or the parts connected with it, having been

figures display the inner face of the sacrum and coxyx. The external surface is convex and rough; and there are four or five processes placed below each other in a perpendicular line, more strongly marked at the upper part of the bone, assimilated to the spinous processes of the vertebræ; they may therefore be called the *spinous processes of the sacrum*. The bone indeed appears, as it were, an imperfect continuation of the vertebral column; the peculiarities

burned as a votive offering in the sacrifices of the ancients, or otherwise dedicated in a special manner to the Deity sought to be propitiated. The only ground for such a supposition that I have been able to trace in the classical writings, is the following line of Menander—*οἱ δὲ τὴν ὀσφυν ἄκραν θυσάντες*; “but they were sacrificing the lower parts of the loins;” which, indeed, is cited by Stephens, in his Thesaurus, as the authority for this idea. But Menander’s works have come down to us in such disjointed fragments, so mutilated and corrupted, that we cannot rely on any passage as genuine, especially when, as is the case here, one line only of a sentence is preserved, without context, either preceding or following; and had the erudite Stephens been able to adduce a quotation from any other author of repute, he would certainly not have preferred Menander. It is well known, indeed, that in the earlier heathen sacrifices, the whole of the victim was reduced to ashes; and that in the latter ages, when the priests, through their necessity or cupidity, reserved the edible parts for themselves and their followers, the entrails only were consumed; and no part of the skeleton seems to have been preserved or held more sacred than the rest, with the exception of the skull, which was sometimes nailed up in the temples, and was eventually adopted as an architectural ornament. Others presume the name to have been derived from its size, being the greatest bone in the spine. (Parr’s Dictionary. *Monro* on the bones; *Plut.* x. 83;) and the term *ἱερά σπυρίγξ*, (*Pollux*,) employed to designate the spinal canal, might perhaps favour this notion; though it would also bear the signification hidden or secret. *Rufus Ephesius*, the principal Greek authority on anatomical names, says this bone is so called from being the largest in the vertebral column: *ὅ γὰρ ἱερον ὀστοῦν καλοῦμεν σπυρίθως τῶν ἀρχαίων ἱερά τα μεγάλα καλοῦντων*. “We call it the sacred bone, after the ancients, who called large things sacred.” (*De appellat. partum corp. human. lib. iii. c. 4.*)

Others, again, (*Hooper*,) from its supporting the organs of generation, which were held sacred, or from the belief that it performs some sacred and mystical office in labour, “quod in eâ aliquid sacri arcanique insit;” since it was supposed to open and separate from the other bones by a divine power inherent

of the vertebræ becoming less evident, and dwindling away by degrees in the sacrum as they descend. Anterior to this series of processes, there is a hollow cavity extending the whole length of the bone—a continuation of the spinal canal—for the reception of the *Cauda equina*, which is the inferior portion of the spinal marrow. Four pairs of holes are seen, one on the side of each spinous process, communicating with this canal: these are for the

in itself, and after the birth of the child to become again consolidated, “miro quodam naturæ opificio.”

Scheller, in giving the definition “secret” as well as “sacred” to *sacra*, quotes, as an instance of this employment of the term, Cœlius Aurelianus; who states that the “os sacrum” is so called: “quod imum ventrem sustinet!”

All these derivations appear to me to be too fanciful and improbable; and I think we may trace the term *ἱερον* in connexion with this bone to an age even more remote than the earliest period of the Grecian empire. **הֶרֶן** Herōn, in the original scriptural language, signifies conception, gestation, and the process of parturition. (Genesis iii. 16; Ruth iv. 13; Hosea ix. 11.) From that word it seems to me by no means improbable that the Greeks derived their appellative of Juno *Ἥρη*, “veluti præses nuptiarum,” who presided over marriage and childbirth; which latter office, also, was the peculiar province of the Juno Lucina of the Romans. *Ἥρη* has indeed usually been derived from *ἔρω*, to love, “ὥς ἐράτην τινα,” as being an amiable personage; but, putting out of the question that the poets did not paint Juno’s character in the most amiable light, the very rare circumstance of an asperated word having for its root an unasperated one, would lead to the belief that such a derivation was incorrect.

From the frequent and intimate intercourse which was held from the remotest time between the Jews and all the other civilised nations of the world, we may readily conclude that the Greeks were well acquainted not only with the Jewish superstitions, but also with their familiar phrases. If we grant this, we may as readily imagine that they were acquainted with the Hebrew word **הֶרֶן**, Herōn, as indeed I consider their own appellative *Ἥρη* proves. Thus, this bone would be called *ἱερον ὄστέον*, as being the part where the pains of labour were principally felt; and by a very slight change of pronunciation, a most easy and natural transition, or by the ignorance of transcribers, the *ἱερον* would be corrupted, and slide into *ἱερον*, especially as this latter word was one in very common use with them. In this manner it would acquire the name *ἱερον ὄστέον*; and the Latins translating it, would retain the Greek phrase,

transmission of small nerves from the cauda equina to the soft parts covering the sacrum and structures adjacent. Internally the sacrum is smooth, resembling in this respect the other bones of the pelvis, and concave. Four white lines, generally rather eminent, run horizontally across it, indicating the situation of cartilage in early life, by which the bone was divided into five distinct pieces. There are also four pairs of holes within; one at the ex-

without knowing how it originated. If this be true, the *ἕρον ὀστέον*, os sacrum, will signify no more than the bone intimately connected with the internal organs of generation, or chiefly affected by the throes of parturition.

It is worth remarking, that a curious superstition connected with the sacrum or coxyx, sprang up among the Jews soon after the christian era, and became one of the Rabbinical doctrines; viz. that part of the skeleton would resist decay, would remain unchanged, and become the germ from which the body would be raised in the resurrection. The bone invested with this restorative power was called the *לֹז*, luz, and was the lower part of the spinal column. Thus, Buxtorf, (*Lexicon Chaldaic. Talmud. et Rabbin. col. 1129*), “*Lus nomen ossis cujusdam in corpore humano quod scribunt Hebræi esse incorruptibile, ac propterea ejus beneficio futuram totius corporis resurrectionem.*” For which he quotes several Rabbinical authorities, giving Latin translations: “*Lus est os spinæ dorsi in homine quod non comburitur, neque corrumpitur in perpetuum.*” “*Lus est os parvum in fine Vertebrarum; totum corpus putrescit, excepto isto osse.*” “*Lus vertebrarum, inde Deus regerminare faciet hominem in futurum,*” &c.

Butler, in his celebrated satire, has pleasantly introduced this superstition:—

The learned Rabbins of the Jews
Write there's a bone, which they call luz,
I' th' rump of man, of such a virtue,
No force in nature can do hurt to;
And therefore, at the last great day,
All th' other members shall, they say,
Spring out of this, as from a seed
All sorts of vegetals proceed;
From whence the learned sons of art
Os sacrum justly style the part.

HUDIB. Canto ii. Part iii.

In a very ancient Hebrew exposition of the Holy Scriptures, known by the name *Medrach Rabbath*, treating of the Deluge, we read (p. 28-6,) on the

tremity of each of these white lines, for the transmission of nervous filaments, to form a portion of the great sciatic nerve, as well as to supply the organs contained within the pelvis. The concave plane—the *cavity* or *hollow* of the sacrum^a—varies in regard to the segment of the circle which it forms in different individuals; and if it be too straight, or too much curved, it will equally impede the ready passage of the child's head in labour. The centre of the upper edge of the bone projects forward; so that in its natural position this part looks somewhat over the cavity, and diminishes the space at the brim. This is called the *prominence* or *promontory* of the sacrum.^b On

authority of Rabbi Simeon, son of Yoradek, the destruction was so complete, that not even the *luz*, from which man was to be restored at the resurrection, was saved; for the Almighty would not preserve a vestige of the race then existing, except Noah and his family. It goes on to say, that Rabbi Joshua, son of Haninah, being desirous of proving to the Roman emperor Adrian the truth of the resurrection, took a *luz*, and “attempted to grind it in a mill, but it would not be ground; to burn it with fire, but it would not be burned; he put it in water, and it was not destroyed; he placed it on an anvil, and began to strike it with a hammer, but the anvil was split, and the hammer burst asunder without it diminishing aught.” Had this superstition arisen prior to Hippocrates' time, we might suppose that the Greeks borrowed from it their term *ῥερον ὄστέον*, in consequence of the presumed incorruptible nature and holy function of the bone after death. But as this fable cannot be traced farther back than the age of Adrian, who lived in the second century, such a supposition of course falls to the ground. *לז* is one of the Hebrew words for an almond or an almond tree; and the phrase, “*Os parvum in fine vertebrarum*,” would evidently imply the coxyx. The coxyx, then, might have been so named from its supposed resemblance to an almond, being slender and pointed. But it is probable that this term was applied either to the sacrum or coxyx, or both of these bones conjointly. Now the Jews adopted the almond tree as an emblem of haste and fertility, from the rapidity with which it brought its fruit to perfection (Jer. i. 11-12, also Ecclesiast. xii. 5, where I have followed Mendelsöhl, who translates the passage differently from the ordinary version, and takes the almond to signify the ovary). From the figurative character of the Hebrew language, it is easy to suppose that the word used as the symbol of fertility might be transferred to any of the organs connected with the process of reproduction; and the very name *לז* applied by the

it the last lumbar vertebra rests, a portion of intervertebral substance being placed between them; and it supports the whole weight of the trunk, head, and superior extremities. When the brim of the pelvis is distorted, the irregularity of shape is almost always attributable to the prominence of the sacrum, together, perhaps, with the last lumbar vertebra being thrown too far forwards, and too closely approaching the pubes. The entrance to the cavity is thus preternaturally constricted; and the diminution of space in this way produced is one of the most common causes of lingering labour met with in this city.

The lateral surfaces^c are very rough, and correspond in extent and irregularity with that part of the inner face of the ilium which forms the sacro-iliac symphysis.

This bone is connected at its upper part to the last lumbar vertebra, through the intervention of a layer of intervertebral substance, to the coxyx below, by a moveable, ginglymoid joint, and to the ilium on each side by the sacro-iliac symphyses. It is also connected to the ischium by the sacro-sciatic ligaments.

The Os COXYGIS* (*d*) appears like a continuation of, or an

Jews to the sacrum or coxyx, seems to strengthen the idea I have formed of the origin of *ἱερον* in connexion with the first-named bone.

The Arabians held the lower portion of the spine in similar veneration. Sale, in the learned discourse prefixed to his translation of the Koran, (edit. 1821, p. 104,) says, “Mohammed has taken care to preserve one part of the body, whatever becomes of the rest, to serve for a basis of the future edifice. For he taught that a man’s body was entirely consumed in the earth, except only the bone called al ajb, which we name os coxygis, or rump-bone; and that as it was the first formed in the human body, it will also remain uncorrupted till the last day, as a seed from whence the whole is to be renewed.”

I feel I ought to apologize for introducing so long a digression upon a point of no practical importance; but the question is curious, and any light that can be thrown on the origin of obscure terms must be interesting to the student. *Os Basilare* is evidently derived from *βασίς*, a step, the foot, a pedestal, or support.

* Κοκκυξ, a cuckoo.

appurtenance to, the sacrum ; but it is of much importance in obstetrical study. It was denominated coxyx from its resemblance to the beak of the cuckoo, one of the hawk tribe. It is therefore, as the name would imply, in shape hooked and pyramidal : the base is placed upwards, the apex below. The bone is divided into three, and sometimes four, distinct portions, which play upon each other by separate joints. Externally it is convex and irregular, concave and smooth within, and terminates in a tapering point, which is bent forwards in the ordinary state of the parts to support the lower end of the rectum.

The coxygeal joints are of great value in the process of labour. Their mobility much facilitates the exit of the head, by enlarging the outlet of the pelvis in the antero-posterior direction. The increase of space thus gained amounts to an inch or more ; for the point of the bone may be bent backwards to a line continuous with the sacrum, or even beyond, so as to form an angle outwards (plate 4, fig. 2, *a. b.*)

Occasionally, indeed, the coxyx becomes anhelosed to the sacrum, and its own joints also are destroyed by a deposition of osseous matter between the separate pieces, so that their mobility is lost, and the bone becomes, as it were, a portion of the sacrum itself. Such a consolidation must offer a considerable impediment to the expulsion of the head, by contracting the pelvic outlet : and this, though a rare, is therefore another cause of lingering labour. It is most usually met with in women bearing a first child late in life, and those who have been accustomed to sit through the principal part of the day, as is the case with milliners.

When the coxyx is in this state, it will sometimes break : this may happen as well during a strong, unaided uterine contraction, as under the employment of instruments. The

occurrence of such an accident may be known,—perhaps, by the attendant being sensible of the part having given way, while his hand was employed protecting the perineum;—and perhaps by his hearing the noise peculiar to bones when fractured. I have seen three cases in which the bone broke, or the anhelosed joint gave way; in none of these did any permanent injury ensue. There was some pain and inconvenience for a time, but eventually re-union was effected, and the distress occasioned was inconsiderable. The best mode of treating such a mischance would be to keep the patient in a state of perfect rest, to interdict her lying on her back, to prevent, if possible, any external pressure on the part, and to keep the bowels moderately open. On the one hand, the frequent evacuation of the rectum, by causing almost constant movement of the fractured portions one upon the other, would interfere with ossific union: and, again, if the lower bowels became filled with hardened fæces, their expulsion would probably disturb whatever degree of reparation might have been procured. Thus, both extremes of immoderate action and excessive constipation must be avoided. In the management of the patient, not only should our object be directed towards obtaining a consolidation of the separated ends, but we should also endeavour to preserve the coxyx, as nearly as we can, in a continuous line with the sacrum; for it is evident, that if the junction take place while the point of that bone is directed greatly forwards, the size of the pelvic outlet will be lessened in the same degree; and in any subsequent labour a proportionate difficulty will necessarily exist. The coxyx is called vernacularly the *huckle* or *knuckle*, and sometimes the *whistle-bone*.

Form and Dimensions of the Pelvis.—When we examine the pelvis with reference to labour, we must attend not only to its figure, but also to its dimensions, and the

bearings which its axes hold in regard to each other, and to the trunk of the body. We observe that it is formed on the principle of the double arch, which structure in architecture possesses the greatest possible degree of firmness that can be devised for the quantity of material employed. So that the pelvis combines, to an eminent extent, the qualities of strength and lightness.

Anatomists distinguish the pelvis into two grand divisions, the *true* and the *false pelvis*, considering the *alæ ilii* to constitute the false portion. The *alæ ilii*, however, are of trifling interest to us as obstetricians; for, unless the organ be inordinately distorted, they have little or no influence over the process of parturition, being quite out of the way of the head's descent. Obstetrically it is divided into the *brim*, or superior aperture (plate 3, fig. 1;) the *outlet*, or inferior aperture (fig. 2;) and the *cavity* all that is embraced between these two; and the peculiarities belonging to each of these parts offer themselves next for observation.

In demonstrating the shape and size of the female pelvis, it is the custom not to describe any particular specimen which we may happen to possess, but to assume a model of perfection, which we consider *the standard*; so symmetrically formed, as would most completely answer all the intentions that nature has assigned to it.

THE BRIM, somewhat oval in shape, has necessarily two diameters,—the longest from side to side—the shortest in the centre from before backwards. The regularity of the oval is broken, principally by the jutting forwards of the sacral promontory (plate 3, fig. 1, *a*), so that the outline represents, in some measure, the heart, as painted upon playing cards. But this resemblance is stronger in the male than in the pelvis of the opposite sex, because the longest diameter in the male pelvis is antero-posteriorly, (plate 2, fig. 1,) while in the female, as just shown, it is laterally (fig. 2.)

The *lateral*, *transverse*, or *iliac* diameter, measures five inches and a quarter (plate 3, fig. 1, *c. d.*) ; the *antero-posterior*, *sacro-pubic*, or *conjugate*, measures four (*a. b.*) ; the two *oblique*, or *diagonal*, extending from the sacro-iliac symphysis to the ramus of the pubes, on the opposite side of the body (*e. f.*), are nearly the same as the direct lateral, probably not so great by about a quarter of an inch. These admeasurements are, of course, considerably less in the recent pelvis and the living body, in consequence of the room occupied by the soft structures ; we must allow for their lodgment at least a quarter of an inch in the conjugate diameter, and half an inch in the lateral, to which extent the available space in labour will probably be diminished.

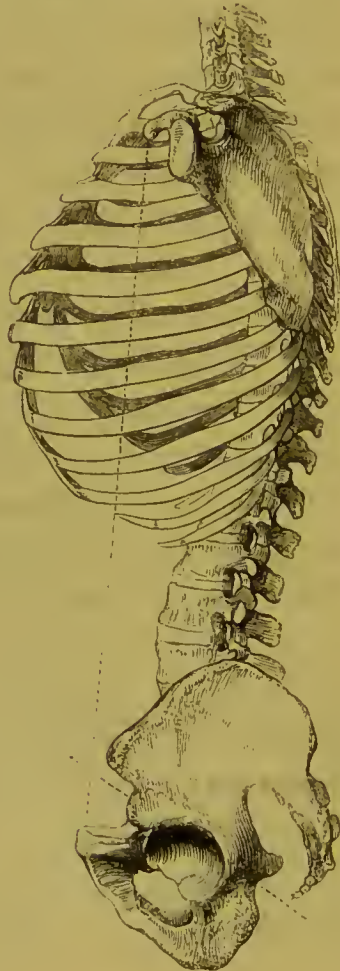
It has been much disputed whether the iliac or the oblique diameter should be considered the longest ; we shall find, I think, that in by far the greatest proportion of well-formed pelves, divested of the softer parts, the iliac measures most ; but when the contents, linings, and muscles are preserved, the greatest space is along the oblique line.

THE CAVITY is observed to be deep behind, shallow in front ; and it becomes gradually shallower as we traverse from the back to the fore part. The greatest depth is from the sacral promontory to the tip of the coxyx, and should be from five inches and a half to six inches ; at the side, from the lowest point of the tuber ischii to the brim, three inches and a half ; and behind the symphysis pubis, one and a half (plate 4, fig. 2.)

THE OUTLET is also inclining to an oval shape, but is even of greater irregularity than the brim, owing principally to the projection of the tip of the coxyx behind, and to the large sinuosity in front, the arch of the pubes (plate 2, fig. 2, and 3, fig. 2, *a. b.*) In extent the diameters of the outlet are nearly the same as at the brim ; in situation they are re-

versed. Thus the long diameter is from before backwards, in a line extending from the point of the coxyx to the under edge of the symphysis pubis (plate 3, fig. 2, *a.*); and when the bone is pressed back in labour, this measures five inches or more; although, in the ordinary state of the parts, the extremity being directed forwards, its utmost extent is only four. The short diameter extends laterally, from the tuberosity of one ischium to that of the other, is incapable of being increased, and measures four. (*b.*)

The outlet is bounded by the tip of the coxyx at the back, by the lower edge of the under fasciculus of the sacro-sciatic ligament posteriorly and laterally, by the tuberosities of the ischia at the side, by the ramus of the ischia and pubes anteriorly and laterally, and by the symphysis pubis in front.



The position of the pelvis, in regard to the trunk of the body, is neither perpendicular to the horizon, nor horizontal, but oblique, the sacral promontory being raised considerably above the level of the pubes; so that a line drawn through the trunk, in a direction of its axis, would, in falling downwards, strike on the centre of the symphysis pubis. It is by resting on this bone that the uterus is supported during the latter months of pregnancy. Were the axes of the trunk and pelvic entrance in the same line, owing to the upright position of the human female, the womb, towards the close of gestation, would gravitate low into the pelvis, and produce most injurious pressure on the contained viscera; while, in the early months, not only would the same distressful inconvenience be occasioned, but there would be great danger of its protruding externally, and appearing as a tumor between the thighs, covered by the inverted vagina. In the quadruped, since the uterus is entirely supported by the abdominal parietes, the effects of gravity on the pelvis need not be counteracted; and we therefore find, that in consequence of the lumbar vertebræ being slightly arched upwards, the axes of the trunk, brim, and outlet are placed nearly in a continuous line.



In the first cut, the two lines mark the axes of the trunk and pelvic entrance in the human subject. In the second, a single line runs entirely through the trunk and pelvis. The drawing from which this cut was made was taken from the skeleton of a cat.

The pelvis itself has also two axes, one of the brim, which is downwards and backwards, following a direction from the umbilicus to the coxygeal extremity of the spinal column; and the other of the outlet, which is downwards and forwards, from the promontory of the sacrum to the central space between the tuberosities of the ischia; so that a line drawn through the brim, in the direction of the axis of the brim, would cross, at a considerable angle, another line drawn in the direction of the axis of the outlet (plate iv. fig. 2.) By a knowledge of the axes of the trunk and pelvic entrance, we can place our patient under labour in the posture most favourable to the easy descent of the foetal head through the brim into the cavity; this is on the side, (the left is usually chosen in this country,) with the shoulders thrown forwards, the back bent into a curve, the thighs drawn up towards the abdomen, and the legs flexed towards the thighs. In this position the two axes are brought more nearly into one line than in any other, and the head is directed more completely over the centre of the brim. It is equally necessary, or even more so, to keep strictly in mind the relation that the two axes of the brim and outlet bear to each other; and this especially while performing any obstetrical operation. When using the forceps, for example, should we neglect this most essential precaution, we shall not only, in all probability, be foiled in accomplishing delivery, but we shall run the almost certain risk of inflicting irreparable injury on the woman.

Joints and Ligaments of the Pelvis.—Besides the joints proper to the coxyx, the pelvis possesses three others

already mentioned ;—one uniting the pubic bones in front, the symphysis pubis—and one on each side of the sacrum, connecting that bone with the ilia, the sacro-iliac symphyses. These articulations are bound together by exceedingly strong unyielding ligaments, as well within as externally. The ligamentous expansions on the interior of the pelvis are much thinner than those on the outside ; and although they assist greatly in strengthening the connexions of the bones, they occupy but little space, and consequently do not encroach, in any considerable degree, upon the room required by the head in labour.

In addition to the ligaments belonging to the joints, there are the *obturator* ligaments, filling up almost the whole of the obturator foramina ; and the *sacro-sciatic*, or *sacro-ischiatic* ligaments, of much interest to the obstetrical student. These run in two fasciculi on each side, the lower obliquely upwards, and backwards from the base of the tuber ischii to the side of the sacrum, and the other horizontally backwards from the spinous process of the ischium to the lower part of the sacrum and the coxyx ; and both are widely spread on the outside of the last-named bones like a fan (plate 4). They tend, in a great degree, to render the outlet of the pelvis firm, by connecting together the sacrum and the ischia. They partake of the relaxation which the soft structures undergo in labour, and a preternatural rigidity existing in their fibres is occasionally a cause of retardation in the process.

Separation of the Joints of the Pelvis during Labour.
—It was for many centuries the prevalent opinion that the bones of the pelvis always separated, or were disposed to separate, if occasion required it, during parturition, especially at the symphysis pubis, and thus allowed the pelvic dimensions to be increased in every direction. This idea was rendered more probable by analogy ; for it is said that in some animals, as the cow, the bones are absolutely disunited to some extent ; and that the sinking of

the sacrum, occasioned by its own weight and by the softened condition of the ligaments, together with a difficulty in progressive motion, is an indication of the near approach of parturition. Such a separation may possibly take place in the lower animals, but it is certainly not usually the case in the human subject. The joints are liable, indeed, to inflammation; and pus being secreted between the bones may occasion disunion—a disease attended with high constitutional excitement, and no small danger. Sometimes, also, an actual separation of the bones takes place, both during pregnancy and after labour, from simple relaxation of the ligaments, which state gives rise to pain in the part deranged, and an inability to walk or stand without artificial support. This affection, though not attended with so much suffering or hazard as acute inflammation, is nevertheless of a very distressing character, and very difficult of cure; commonly confining the patient to bed or the sofa for many months. But it would be travelling too far out of the limits of this publication to enter minutely into the history of these diseases; and it is sufficient for our present purpose to know that in the great majority of cases there is no sensible relaxation of the pubic or sacro-iliac ligaments; that in others a softening does occur in various degrees, and that when that change reaches such a point as to be attended with pain or inconvenience, it must be considered as morbid.

Difference in Form between the Male and Female Pelvis and Skeleton.—On comparing the male (plate 2, fig. 1) and female pelvis (fig. 2) together, we cannot but remark a striking difference in the general appearance and particular proportions of this organ in the two sexes. We observe that the pelvis of the female is altogether larger and more delicately shaped than that of the male; that the alæ of the ilia spread themselves widely in the lateral direction; while the same parts in the male rise more perpendicularly upwards. The brim is differently shaped;

the long diameter in the female being from side to side; in the male from before backwards. The cavity is considerably smaller in the male, deeper, and more of a funnel shape, the sacrum being much straighter, (plate 4, fig. 1,) and the tuberosities of the ischia inclining closer together. The outlet is also far less capacious; and this arises principally from the approximation of the ischia, which seldom are more than three inches distant at the widest diameter. The arch of the pubes is formed more angularly than in the female, in whom this part approaches nearer to the perfection of an arch (plate 2, figs. 1 and 2.) In the female, too, the rami of the ischia and pubes are smoother on their inner surface, and their anterior edge is turned more outwards. This disposition of the rami helps to enlarge the outlet, and gives an elegance to the whole organ that is wanting in the pelvis of the stronger sex.

All the bones of the male skeleton are firmer and heavier than they are in the female, and more powerfully marked by those irregularities which indicate muscular attachments. The thoracic cavity is comparatively larger, and the acromia are at a greater distance from each other. A line drawn from the head of the humerus, perpendicularly downwards, would fall to the ground altogether clear of the pelvis; but in a well-articulated female skeleton, the same line would rest within the ala of the ilium. It is this difference that gives the broad shoulders to the male, and the swelling hips to the female, and occasions the principal distinction in the outline of the form between the sexes (plate 1, figs. 1 and 2.)*

* These figures are sketched from Maygrier's work. It might perhaps be thought more desirable in some respects, if the characteristic difference between the male and female outline had been shown by drawings of the skeletons; but as the contrast by such a mode of illustration would not have been so strongly marked, I have preferred giving an etching of the full form. The elliptical lines will direct the eye to the principal points worthy of attention.

OF THE FŒTAL HEAD.

Shape and Dimensions of the Fœtal Head at Birth.—

As both the brim and outlet of the pelvis present a form inclining to oval, so the fœtal skull is of a similar shape. It is, indeed, more perfectly oval; the long diameter, when the face is put out of calculation, being from the occiput to the forehead (plate 5, fig. 2, *a. b.*); the short from the tuberosity of one parietal bone, to that of the other (plate 6, fig. 2, *a. b.*)

In extent, at birth, the long diameter measures four inches and a half, and the short three and a half; the circumference, drawn in a line over the ridge of the occipital bone, above the ears, and traversing the most prominent part of the frontal bones, is nearly fourteen inches. It must not be supposed that these measurements are exact or universal, any more than that the admeasurements given of the pelvis are always the same; but as we take a fancied standard pelvis as our guide, in the same manner we choose a standard head—such a one, perhaps, as is most commonly met with. I shall only mention one other diameter of the fœtal head, because, by multiplying such observations unnecessarily, the mind is distracted and the memory clogged, viz. that from the vertex to the chin, which is five inches and a half, capable, however, of elongation under labour, from the head being compressed laterally, to the extent of six and a half or seven inches.*

* It is generally remarked that the skull of the male child is a little larger in all its diameters than that of the female. Of sixty male, and sixty female children, born at full time, Dr. Jos. Clarke found the average circumference of the head to be 14 inches in the males; $13\frac{5}{8}$ ths in the females. The arch, from ear to ear over the crown was $7\frac{1}{4}$ th in the males, $7\frac{1}{5}$ th in the females. Of the 120 examined, only six exceeded $14\frac{1}{2}$ inches round, and all these were males.—*Letter to Dr. Price.*

The long diameter of the cranium, from the forehead to the occiput, being four inches and a half, and the short diameter three and a half, it follows that when the head is properly adapted to the pelvis, a clear superabundant space of at least half an inch is left between the cranial and pelvic bones, both in the lateral and conjugate diameters, which is generally quite sufficient for the easy passage of the head.

Anatomical Peculiarities of the Fœtal Skull.—The general anatomical character, as well as the form and size of the skull, deserve our attention. It may be seen that the bones are not dove-tailed into each other as in the adult, but are separated to some extent by intervening lines and spaces of membranous formation. The lines are termed *sutures*, from the Latin word *suo*, to sew; the spaces, *fontanelles*, after the French; because it used to be supposed that a moisture distilled from the brain through these unossified apertures. The fontanelle has also been called bregma, from βρεχω, to moisten—the name having originated in the same idea.

The bones in the child's skull requiring our consideration obstetrically are but few, the two *parietal* bones of a square shape, which give the principal protection to the brain laterally (plate 6, fig. 2, *a. b.*); the *frontal* bone anteriorly (plate 5, fig. 1)—or rather the frontal bones, because, in the fœtus there are two,—and the *occipital* posteriorly (plate 7). The *parietal* bones are separated from the frontal, or connected with them, by a suture called *coronal* (plate 6, fig. 1, and plate 5, figs. 1 and 2,) which runs from near the external angle of one eye to the same point on the opposite side of the head, bounding the forehead superiorly. It is called *coronal*, because the ancients used to wear their *coronæ* or garlands on that part of the head upon festive occasions. The parietal bones are separated from the occipital by a suture, termed *lamdoidal*, from its resemblance to the

Greek letter, Λ , (plates 7 and 5, fig. 2.) The two parietal bones are separated from each other by the *sagittal* suture (plate 6, fig. 2,) which runs longitudinally along the centre of the upper part of the head, so called because it was fancifully supposed to be situated between the lamdoidal and coronal sutures, as an arrow is placed in a strung bow. The two frontal bones are separated by the frontal suture (plate 5, fig. 1,) which runs directly upwards from the root of the nose. The remaining sutures of the head are out of the way of our obstetrical observation, and a description of them would therefore be useless.

The two fontanelles are placed, one at each extremity of the sagittal suture; and they are named, according to their situation, *anterior* (plate 6, figs. 1 and 2,) and *posterior* (fig. 2, and plate 7.) The anterior fontanelle is by far the larger, quadrangular or diamond-shaped: it is sufficiently extensive to take in the whole extremity of the finger, and can scarcely be covered by it. The posterior is small and triangular. The peculiar form of the anterior fontanelle is caused by the junction of the corners of four bones rounded off, the two parietal and the two frontal; the posterior is formed as a triangle by the union of three bones, the superior posterior angles of the two parietal bones, and the upper angle of the occipital bone.

Necessity for Learning the Situation of the Fontanelles and Sutures.—An accurate knowledge of the form and situation of these fontanelles is of absolute necessity for the successful practice of the obstetric art; for by them we detect the position of the foetal head in the early stage of labour. The vertex is generally the presenting part, or that which offers itself most readily to the finger on examination.* This may be regarded, then, as the most natural

* The term *vertex* is applied to that part of the head from whence the hair diverges as from a centre. It is generally described as being directly over, but, in fact, it is placed rather before the posterior fontanelle.

presentation ; the head, when placed with the vertex downwards, will pass through an aperture of much less dimensions than it would do, were any other part descending first. In plate 7 a view of the vertex is given, and two somewhat oval lines are traced surrounding it. One of these ovals is an inch, in its long diameter, greater than the other. The smaller shows the quantity of space requisite for the transit of the head, when the vertex offers itself, four inches and a quarter by three inches and a half in diameter ; the larger indicates that necessary for the same head, when the brow or anterior fontanelle presents, being five inches and a quarter by three and a half ; and by contrasting the two together, the student will be able to form a correct idea of the advantages appertaining to the presentation of the vertex.

If, then, in an obstetrical examination we distinguish the posterior fontanelle readily, we know that the vertex is presenting ; we may presume that the fœtus is placed in the most favourable position, and we may augur, *cæteris paribus*, an easy termination of labour. If, on the contrary, we at once distinctly feel the large open, diamond-shaped space, we are satisfied that the brow or forehead is downward. We know that this is an unfortunate situation of the head, because so much more room will be occupied in its transit ; and we are, therefore, prepared to expect that the case will be lingering ; we may even feel justified in attempting to place the head in a better direction.

Nor is it of less moment that the sutures should be attended to. The cranium ordinarily enters the pelvis with the face looking to one sacro-iliac symphysis. Should we then detect the sagittal suture running diagonally across the pelvis, we infer that the long diameter of the head is in the direction of one of the long diameters of the pelvis, and so far all is well ; but if it

crosses the brim in a direct line antero-posteriorly, the head is placed with its long diameter in the short diameter of the pelvic entrance; and we know that it cannot pass into the cavity while so situated, provided the skull and pelvis are both of normal form and size. Having obtained this information, we regulate by it both our prognosis and our practice.

Advantages of the peculiar structure of the Fœtal Head.—Many advantages attend on this peculiar conformation of the foetal skull. On the one hand, the bones being separated by intervening lines and spaces, permit a more uniform growth and development to the tender brain than could take place had the cranium been originally composed of one solid bony case; and on the other hand, (which indeed most interests us as obstetricians,) a certain degree of compression is allowed under labour; the edge of each bone has an opportunity given to it to ride a little over its neighbour; the capacity of the child's head is thus diminished, and it is capable of being propelled through a smaller space than if it had been fashioned of one continuous piece. This power of diminution is greatest in the lateral diameter; and a full-grown foetal head may be lessened from side to side, without endangering the child's life, one-seventh of its own extent, or from three inches and a half to three inches. This overlapping of the bones in labour is of common, nay, almost universal occurrence; and the compressibility of the head should teach us to hesitate, and consider well the bearings of the case, before we take in hand an obstetric instrument, especially such an one as cannot be used without the sacrifice of the child's life; for it is constantly observed in practice, that a fortunate and natural termination has occurred in cases where, a few hours before, it was believed impossible that the child could be born without instrumental interference.

Some practitioners suppose that another good effect is produced by the compressibility of the fœtal cranium. It is thought that, in the passage of the head through the pelvis, the child is thrown into a state of sleep or torpor, during which its limbs are for the time paralysed, and it is consequently prevented injuring the maternal structures by any violent movement or struggle. I am inclined myself to subscribe to this opinion.

Expulsion of the Head vertically.—The student being now acquainted with the size and figure of the female pelvis, and the dimensions of the child's head, is prepared to understand the mechanism of its passage in cases of ordinary labour. It enters the brim with the vertex as the most dependent part, with the face to one ilium and the occiput to the other, or more commonly with the face looking towards one sacro-iliac symphysis, and the occiput behind the groin on the opposite side of the body. Descending in this direction, it takes full possession of the cavity, and the forehead and occiput impinge respectively on the inner surfaces of the tuberosities of each ischium. Since, however, in this position, its long diameter is opposed to the short diameter of the outlet,—since the tuberosities of the ischia are unyielding,—and since the long diameter of the head exceeds the short diameter of the outlet by half an inch,—it is evident that a change in its relative situation must be made before it can be expelled. This alteration is effected by a slight rotation of the cranium; the face is thrown into the hollow of the sacrum, the occiput peeps up under the arch of the pubes, and the head eventually escapes with the face sweeping the sacrum, coxyx, and perineum. This turn is produced by mechanical causes, and depends on the resistance which the peculiar construction of the pelvic bones opposes to the propelling efforts exerted by the uterus:—the inner surfaces of the ischia, somewhat approaching each other as

they descend, together with the spinous processes of the same bones, afford an inclined plane along which the head is directed ; the hollow of the sacrum offers an unoccupied cavity, into which the face is received, and the arch of the pubes a wide-spreading sinuosity, through which the occiput insinuates itself. The fœtus, indeed, does not assist in the least degree, by any voluntary action of its own, to perfect this change ; it is entirely to be explained on mechanical principles ; and the opinion of the ancient physicians, that the child, by its innate powers, assists in liberating itself from its imprisonment, is perfectly fallacious.

OF DEFORMED Pelves.

Fortunate would it be for child-bearing women if they each possessed a pelvis of the figure and dimensions already given as the standard. Such, however, is by no means the case ; and this organ is subject to great varieties, as well in form as size. It would, indeed, be difficult to select from all the preserved specimens in existence, any two which exactly resemble each other—agreeing minutely in shape, dimensions, and weight. Many are found to be much above the ordinary volume, and numbers, on the other hand, greatly below it.

The want of due capacity sometimes originates in natural formation ; thus a woman of short stature, although of tolerable symmetry, might be expected to possess a diminutive pelvis ; but this is far from being an universal, or even general remark. Again, the re-union of the bones after fractures will commonly occasion both distortion and contraction of space ; but when there exists a deficiency of room to any great extent, the irregularity is mostly dependent on disease of the bones themselves.

If we look at the head of the child, and the cavity through which it has to traverse, in a mechanical point of view, (which we must do before we can arrive at a correct knowledge of the process of parturition, even in the simplest and most easy state,) we shall immediately perceive that *size*, as regards the head and the pelvis, is entirely a relative term ; and that a pelvis preternaturally small, or a head unusually large, will each in practice occasion difficulty in the same degree as they deviate from the standard dimensions ; so that it matters little whether the disproportion be the consequence of diseased action or any other cause ; provided it exists, to a certain extent, it must necessarily be productive of a protracted struggle.

There are two diseases particularly through which the pelvis suffers considerable deterioration in size,—*rachitis* or *rickets*, a disorder of childhood,—and *mollities ossium* or *malacosteon*, one of adult age. In both these affections there is a want of due solidity in the osseous system throughout the whole body. The animal matter entering into the composition of the skeleton being in great excess, and the earthy matter in proportionate deficiency, the bones yield like softened wax ; the regularity and beauty of the pelvic form, as well as of other bony cavities, is destroyed, and the miserable specimens of distortion portrayed in plates 8, 9, 10, and 11, are the result.

Deformity may be partial or general,—partial when either of the parts, the brim, cavity, or outlet, is simply the subject of derangement,—general, when all these are more or less involved. If the vicious formation be confined to the brim, the diminution in size is almost always produced by the promontory of the sacrum jutting too far forwards, and by this means contracting the conjugate diameter ; if to the cavity, by the sacrum being too straight, so that the bone does not possess its due curvature ; if to the outlet, by the tuberosities of the ischia approaching too near each

other ; or by the spinous processes of the same bones being too long, and directed too much inwards ; or again, by the joints of the coxyx having become anhelosed, and having thus lost their mobility. Of these irregularities the most frequent is that met with at the brim ; the most rare, an undue straitness of the sacrum.

It is easy to account for the frequency of contraction at the brim, because the base of the sacrum supports the whole weight of the trunk, head, and upper extremities ; and as the sacral promontory partakes of the curve forward proper to the lumbar vertebræ, it is reasonable to suppose, that if any degree of softness exists in the bones, they will bow at this point first, being unable to resist the superincumbent pressure. Giving way in this manner, the lowest lumbar vertebra, and the upper part of the sacrum, will be thrown inwards, so as to dip over the entrance to the pelvic cavity.

If we rest a perfectly straight wire perpendicularly on a table, and place a weight upon its top greater than it can sustain, it will bend, but at what part we cannot tell. If, however, we make the least elbow in it before we try the experiment, we shall find that it will yield there rather than in any other part. This is exactly analogous to the condition of the sacral promontory and last bone of the loins.

In plate 8 two specimens are given of this kind of deformity at the brim. The original from which figure 1 was engraved, is preserved in the London Hospital Museum : it measures five inches in the lateral diameter ; two inches and three-quarters in the sacro-pubic ; and the same from each side of the sacrum to the ramus of the pubes. This is just below the minimum space through which a full-grown foetal head could pass entire ; but the ischial tuberosities are four inches and three-eighths apart, the distance between them being full a quarter of an inch more

than in a healthy pelvis, so that the outlet is wider than natural; and as the sacral curve is well proportioned, if the head once gained possession of the cavity, it would speedily, and with little further exertion, be expelled.

The second figure represents the pelvis of a woman whom I delivered in a state of great exhaustion, under a primary labour by craniotomy; and is considerably contracted in all its dimensions, more especially at the brim. The diameter, from the centre of the prominence of the sacrum to the symphysis pubis, is only two inches and a quarter; the iliac diameter four inches and three-quarters; on the right side of the promontory of the sacrum to the pubic ramus, the space is two inches and a half; on the left side two inches and a quarter. The cavity is much below the natural size, the depth posteriorly being not more than four inches; the outlet also is considerably diminished, as well by the width between the ischia measuring only three inches and a quarter, as by the elongation of the spinous processes of those bones.

In most cases of partial deformity at the brim, the lateral diameter is increased in size nearly in the same proportion as the conjugate is diminished; but however much the width from ilium to ilium may exceed the ordinary dimensions, the increased space thus obtained will in no degree make amends for the diminution from the sacrum to the pubes; because it is necessary that there should not exist less than a certain quantity of available room in *every* direction to permit the child's transit.

When the deformity is complete by involving the cavity and outlet as well as the brim, it may be of two kinds—angular, as shown in plate 9,—or elliptical, as in plate 11. In the angular distortion the promontory of the sacrum is thrown forwards; the tuberosities of the ischia closely approach each other; and the symphysis pubis projects outwards. The pelvis bears the appearance as though it

were formed of ductile matter, and the pubic bones at each side of their junction had been squeezed forcibly together. In the elliptical, the sacral prominence projects forwards; the tuberosities of the ischia are separated to a much wider extent than is usual; and the bones at the symphysis pubis are flattened, being forced back towards the sacrum; thus a greater lateral diameter is given both to the brim and the outlet.

It is generally believed that the elliptical species of distortion (plate 11) is invariably the consequence of rickets; while the angular (plate 9) is as invariably produced by mollities ossium; and Dr. Hull, in his second letter to Simmonds, has, by a very ingenious chain of reasoning, endeavoured to substantiate this hypothesis. I am far from subscribing to the universal truth of this doctrine; but am inclined to think that both these diseases may occasion each variety.

To render the subject more easily understood, I shall divide pelves into four gradations, and I shall classify them according to their form at the brim, since that is the part most usually, as well as most severely, distorted. The first embraces the standard pelvis—five inches and a quarter in the lateral diameter, by four in the conjugate, and all above that measurement, through which a mature fœtus will escape with facility.

The second class includes those lower than the standard, but sufficiently large to permit the child's passing alive, being either expelled by the unaided efforts of nature, or extracted by instruments which are perfectly compatible as well with its preservation as with the safety and integrity of the woman's structures. A live birth may be accomplished through a pelvis which possesses a clear available space of three inches in the conjugate, by four in the lateral diameter. Some practitioners have thought that a pelvis measuring only two inches and three-quarters in

the conjugate diameter would allow of the head passing whole, provided there were sufficient room laterally. My own conviction, derived from clinical observation, is, that the dimensions I have just mentioned are the smallest which will grant a passage to a full-grown unmutilated foetus.

In the third class is comprehended every pelvis of such a size as would admit of a well-educated practitioner extracting a foetus through it, after the bulk has been diminished by cutting instruments to the smallest possible compass. Although most obstetricians agree that three inches by four is about the least space through which a full-sized foetal head will pass entire, there is an extraordinary difference of opinion in regard to this other question; some thinking that little more than an inch in the conjugate diameter will suffice; others, that very considerably more is required. This discrepancy may perhaps, in some measure, be accounted for by the superior tact which long and constant practice in obstetrical operations gives; for it is reasonable to suppose that a person unaccustomed to these duties will not succeed so well as one to whom they occur frequently. It is left to me, therefore, to form a scale of my own as the lowest limit through which a child can be drawn after mutilation; and I am quite convinced that unless there be at the brim one inch and three eighths in the conjugate, by three and a half in the iliac, or one inch and a half in the conjugate, by three in the iliac, it would be useless to attempt delivery *per vias naturales*; but it will very rarely indeed be found that the lateral diameter at the brim does not exceed three inches. One point, however, should be borne in mind in making this computation, that if the brim alone be distorted, a much less amount of room is requisite for extraction than in cases where the cavity and outlet are proportionally lessened in their dimensions.

In the last class or gradation are to be included all pelves below the minimum space just mentioned ; through which it is impossible for the most skilful and experienced operator to extract a foetus, even after the brain has been evacuated, and the body diminished to the utmost extent that art can accomplish. In cases of such extreme deformity, no means remain of rescuing the woman from death through exhaustion but to open the abdomen, cut into the uterine cavity, and extract the foetus by the artificial aperture ; an operation horrible to contemplate, and which in the British islands has, with three exceptions, proved universally fatal to the mother.

The subjects for the plates have been selected with the view of illustrating the different positions laid down. The measurements of the two distorted pelves in plate 8 have been already given : through the first, some obstetricians think it possible that a full-grown and commonly-ossified foetal head might pass entire with great exertion, though I should much doubt it ; through the second, no mature foetus of ordinary weight could be born alive.

In plate 9 are given two specimens of the angular distortion. The brim of fig. 1, in its long diameter, measures four inches and a half ; the greatest available space between the pubes and sacral promontory is one inch and five-eighths ; on the left side of the promontory there are two and three-eighths ; and on the right side two inches and a half. The tuberosities of the ischia at their nearest points approach each other to within an inch and three-fourths ; and the distance between the tip of the coxyx and the under edge of the symphysis pubis is four inches and a half. It would be perfectly possible to deliver the patient who possessed this pelvis, by the operation of craniotomy.

Fig. 2 is a cast of the pelvis (now so well known from the copies having been multiplied to a great extent) of

Isabel Redman, on whom Dr. Hull performed the Cæsa-rean operation on Sept. 22, 1794. A single glance will show its extreme deformity ; to demonstrate which, it is only necessary to mention that a ball of one inch in diameter will not pass through the brim at any part. I believe this is the smallest pelvis, as far as regards the brim, on record.

Fig. 1, plate 10, represents the bony pelvis of a woman, the subject of one of the late Mr. Barlow's cases of the same operation ; by whom the preparation was presented to me. From the junction of the fourth and fifth lumbar vertebræ (which is the most projecting point, in consequence of the sacral promontory being thrust down considerably lower than the level of the pubes) to the outer surface of the symphysis pubis, is three inches ; the clear space within being, from the same point to the ramus of the pubes on the right side, seven-eighths of an inch, on the left side an inch and three-eighths ; from the same point to the acetabulum on the right side, three quarters of an inch, on the left side an inch and a quarter. The greatest quantity of available room in the antero-posterior diameter, is from the left side of the sacral promontory to the ilium, and measures an inch and a half. The greatest lateral space following the curve, is five inches and three-eighths ; at the outlet, the ascending rami of the ischia are in close contact, and the centre of the tuberosities are an inch and a half distant ; the sacrum just below its centre is curved at an acute angle upwards, so as to bring the apex of the coxyx to within an inch and a half of the promontory of that bone, and two and a half to the point where the two rami of the ischia touch each other. Although the operations undertaken in both these instances proved fatal, nobody can deny the necessity and propriety of their performance.

Fig. 2, in the same plate, is taken from a lithographic

drawing in the work of M. Moreau, now in the course of publication. It is introduced here for its rarity. The original is in the anatomical collection in the Maison d'Accouchemens at Paris; but I have not been able to meet with a similar specimen in London. Two or three may be found in which a tendency to this figure exists, though in a very slight degree; and one is preserved in the University College Hospital that very much resembles it. That, however, is a male pelvis, and the deformity was occasioned by fracture; this is a female, and the cause was disease.

Plate 11 demonstrates the elliptical variety of distortion from casts. In Fig. 1 the distance between the symphysis pubis and sacrum is one inch and a half; on the right side of the sacral promontory in the antero-posterior diameter there are two inches; on the left side, only three-fourths of an inch. The lateral diameter of the brim following the curve in a central line equidistant from the sacrum and pubes, measures six inches and a quarter; at the outlet, the extreme width between the ischia is five inches and a half; from the apex of the coxyx to the under part of the symphysis pubis, four and a half. Through a pelvis of this form and size the fœtus might be extracted by the instruments adapted to craniotomy.

The original of fig. 2 is much smaller, and I fear, if such a conformation existed, the child could only be extricated by the abdominal incision. In this instance, from the pubes to the sacrum measures no more than three-fourths of an inch; on the right side of the sacral promontory there is one inch and a quarter; on the left side, an inch and five-eighths. At the outlet, the tuberosities of the ischia are four inches and an eighth asunder; but the space between the apex of the coxyx and the under part of the symphysis pubis is only two inches.

These examples will be sufficient to give an idea of the great alteration which the pelvis undergoes when its bony structure is attacked by disease ; it is needless, therefore, to adduce a larger number.

OF PELVIMETERS.

Much ingenuity has been displayed by our Gallic neighbours in the invention of instruments for the purpose of measuring the conjugate diameter of the pelvis at the brim ; and Coutouli's pelvimeter, and Baudelocque's calipers, are those best known. The former consists of a flat base and a moveable slide, into which it is fitted ; at the end of both the base and the slide a piece of metal projects at right angles. This instrument, indeed, resembles that by which shoemakers are accustomed to measure the length of the foot : it is to be introduced within the vagina ; the extremity of the base is to be carried up to the promontory of the sacrum, and the projection at the end of the slide brought behind the symphysis pubis. By a scale which hangs out beyond the external parts, the space between the apex of the pubic arch and sacrum may be known. Making, then, an allowance for the difference between the oblique and direct diameter, it was supposed we might become acquainted with the actual available space there existing. This contrivance is easily adapted to a skeleton pelvis, and so would a common rule be ; but its application when the soft parts are preserved, is difficult ; and, from its straight figure, impossible, if any part of the child's head be engaged in the pelvic brim. As, therefore, that pelvis must be exceedingly distorted which would not allow the head to descend somewhat into the cavity, Coutouli's pelvimeter is found practically valueless.

The *compas d'épaisseurs*, or *calipers* of Baudelocque,

are intended to be applied externally to the woman's person. They consist of a base or handle, formed of two parallel pieces, and joined at their lower extremity by a hinge; from the upper end of the handle two curved arms rise, having at their points two small buttons. One of these is to be placed upon the outer surface of the symphysis pubis,—the mons veneris; and the other on the lower end of the loins, opposite to the sacral promontory. A scale of inches is adapted to the handle, and so calculated, that it is supposed to indicate the exact space between the promontory of the sacrum, and pubes within the pelvis. This may, perhaps, be perfectly true in regard to a standard pelvis, or one deviating but little from the ordinary size; but no person can regard the various specimens of deformity shown in the plates, without being perfectly convinced that, if taken as our guide in all cases of distortion, it would afford the most conflicting and erroneous results.

In plate 12, fig. 1, the application of both these mechanical inventions is sufficiently well displayed to require no further illustration.

Such contrivances for the purpose of measuring the pelvic brim have by no means met with the sanction of British practitioners in general; but they are in the habit of depending for this information on examinations conducted by the fingers, or the hand. Three methods are practised: one is, by the introduction of the first finger of the right hand within the vagina, so that the point should be carried up to and touch the sacral promontory, while the root of the finger is applied exactly under the symphysis pubis, at the upper part of the arch, (plate 12, fig. 2.) It must be evident that this mode of inquiry will be of no avail unless the pelvis be greatly distorted,—considerably under three inches, indeed, in the conjugate diameter. For the ordinary length of the index finger

along its inner edge, is less than three inches ; and as the oblique line from the promontory to the apex of the pubic arch exceeds the direct line across, so if there be more than the space just mentioned, the finger would not be able to reach the projection, and we should consequently be in utter ignorance what amount of room existed. If the pelvis be very small, the sacral promontory can be felt with ease ; but even in that case the dimension of the direct conjugate diameter is not afforded, but the length of the oblique line is given ; and it is not always possible to calculate the difference between these two lines accurately.

Another mode which has been recommended is the introduction of the whole left hand within the pelvis, with the outside or point of the little finger touching the inner surface of the symphysis pubis, and the first finger placed against the promontory of the sacrum. As every man is aware what his hand measures across, it is supposed he will be able to ascertain the transverse width of the pelvis. Thus, presuming the hand to be two inches and three-quarters wide, which is the common average about the centre of the fingers, if, when placed edgeways, it just fits the brim, the examiner will know that the space is within three inches. Again, if he can only introduce three fingers instead of four, he will know that the pelvis does not measure two inches, and probably not so much ; and if he can only pass up two fingers, closed together, he will be assured that there is not more than an inch and three-eighths. But, on the contrary, if, on introducing the whole hand, he be compelled to spread his fingers widely before he can touch the sacral promontory, he will then be certain that the space is more than three inches, probably four, or near it. (Plate 13, fig. 1.)

But it is not always easy to follow this mode of inquiry, because the child's head is generally protruded somewhat

into the pelvis, even when the brim is contracted; and we could not carry the hand up in this manner, and make the accurate examination which we require to do, unless the brim as well as the cavity were perfectly free and unoccupied. It might, perhaps, be employed with advantage, provided the deformity were excessive.

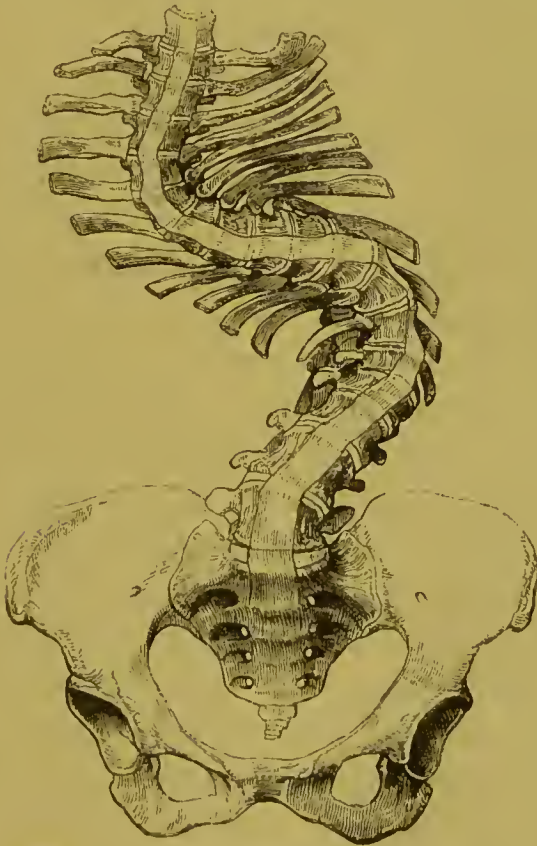
The third method I consider the best, and is the one I myself adopt. Two fingers of the left hand are to be carried within the vagina; the extremity of the first finger is to be placed exactly behind the symphysis pubis, and the tip of the second against the sacral promontory. (plate 13, fig. 2.) By stretching the fingers in this way, we shall have little difficulty in reaching the promontory of the sacrum, even when the pelvis is of ordinary dimensions; and by withdrawing them in the same position, we may measure off the distance between their extremities on the first finger of the right hand, or on a scale of inches, as with the limbs of a pair of compasses; and consequently we arrive at an accurate knowledge of the exact dimensions of the pelvic brim. The laxity of the vagina, and other soft structures, which almost invariably attends the process of labour, will permit the fingers to be withdrawn extended; and if the examiner uses sufficient care, they may be kept perfectly steady until the space which they embrace be ascertained.

This mode of proceeding possesses a great advantage over the other two, inasmuch as we are able equally well to make our examination, whether the head be occupying a part of the pelvic cavity, or whether it be still detained quite above the brim; for even if it be engaged in the vagina, one finger may be passed anterior to, and the other behind it, with comparative ease.

But although in most instances the brim demands the principal part of our attention, the shape and capacity of the cavity and outlet must not be neglected. To inform

ourselves on these points, the fingers being gently carried along the hollow of the sacrum, notice must be taken of the degree of curvature which that bone possesses, and of the mobility of the coxyx. The width between the tuberosities of the ischia, as well as the inclination of the spinous processes, must also be made the subject of observation.

We may *suspect* that the pelvis is deformed if the spine be very much curved, and particularly if with that distortion the thigh-bones be bent considerably; for in such case we may fairly infer that the curvature of the spinal column has not arisen from any local disease of the vertebræ, but from some general constitutional affection, such as rickets, or mollities ossium; and when the system is influenced to any great extent by either of these



diseases, we cannot expect that the pelvis will escape derangement.

It must be borne in mind, nevertheless, that any opinion we may entertain as to the pelvic capacity from the general form will, at the best, amount only to suspicion; for however crooked the spine may be, it by no means *necessarily* follows that the pelvis is distorted. By the annexed cut it will be seen, that although the spinal column has suffered lateral curvature to an extreme degree, yet the pelvis possesses the ordinary diameter at the brim, and the outlet is so slightly diminished in its proportions, that the foetus would be expelled through it with great facility. Instances of this kind are to be met with in every anatomical museum.

It is by internal examination alone,—and that during labour,—that we can obtain any *positive* information as to the state of the pelvis. We may, indeed, in cases of great deformity, even at other times, detect the projection of the sacral promontory, or the approximation of the ischia, by the introduction of one or two fingers into the vagina; but an accurate knowledge of the pelvic dimensions can only be gained when the soft structures are relaxed by the process of parturition.

Of preternaturally large pelves.—From what has been already advanced, it will be readily conceded that few greater evils could befall a child-bearing woman than to be the subject of a contracted pelvis; and it might be supposed, therefore, that the possession of a very large one was to be esteemed a great blessing. But this is far from being the case; and an organ much exceeding the standard proportions must be regarded as very liable to entail danger both on the mother and her offspring.

One of the most common accidents to which a woman with a preternaturally large pelvis is exposed, is the descent of the gravid womb. When a certain period of

pregnancy has passed, the uterus, which before that time had remained within the pelvic cavity, rises by degrees through the brim, and occupies a portion of the abdomen. By this change in its situation, the viscera, blood-vessels, and nerves at the lower part of the trunk, are relieved from the pressure they had been previously exposed to. But whenever the pelvis is sufficiently capacious to give it lodgment for a longer duration than should be, it sinks by its own weight lower than it ought, and much inconvenience is felt from its subsidence. In some cases, moreover, the gravid womb has been known to prolapse beyond the external parts, hanging as a large tumor between the thighs, inverting the vagina, and dragging down with it both the bladder and the rectum. Abortion is likely to be excited by such an occurrence; and thus a preternaturally large pelvis may lead both to the loss of the ovum, and to chronic and confirmed prolapsus uteri.

Another distressing and dangerous accident to which a woman possessing a very large pelvis is generally supposed to be peculiarly obnoxious, consists in the retroversion of the pregnant womb;—when the fundus, instead of mounting towards the abdomen, is turned back upon the promontory, or falls down into the hollow of the sacrum. To a certain extent, this position is true; for retroversion of the uterus is more likely to happen in a case of excessive capacity than where the organ is near the standard size. But by far the greater number of instances of this description which have come under my observation have been combined with a slight diminution of space in the conjugate diameter at the brim; and I am, therefore, warranted in concluding that such a formation more frequently predisposes to this cause of danger than an undue capacity.

A third inconvenience, and one of no trifling importance, is the rapidity with which a fœtus will sometimes

be expelled through a pelvis of extraordinary dimensions. Provided the os uteri be widely open, the other soft parts lax and distensible, and the uterine energies are exerted vigorously, the child may be expelled so quickly that no assistance can be rendered ; under circumstances, too, in which both its own life and its mother's must be brought into imminent peril.

OF THE FEMALE GENERATIVE ORGANS.

The female organs of generation are classed in two divisions—*external* and *internal*. The external consist of the *mons veneris*, *labia externa*, *perineum*, *clitoris* with its *prepuce*, *nymphæ*, *vestibule*, *meatus urinarius*, *hymen* in virgins, and *carunculæ myrtiformes* in matrons.

The internal are, the *vagina*, *uterus*, and *uterine appendages* ; which latter consist of *two broad ligaments*, *two round ligaments*, *two ovaries*, and *two fallopian tubes*.

EXTERNAL ORGANS.

At the lowest part of the abdomen, lying immediately over the pubes, is situated a soft cushion-like eminence, about three inches in breadth, and two in depth, called the MONS VENERIS, (plate 14, *a*.) It is formed of a large quantity of loose cellular tissue, the interstices of which are filled up with much adipose matter ; it is covered by the common cuticle of the body ; and at puberty, studded with a number of short capilli, among the roots of which are embedded numerous mucous follicles.

Arising from the mons veneris, and running down perpendicularly, to unite at a junction below, there are two pouting lips, the LABIA EXTERNA, OR LABIA PUDENDI, (*b*.) In length they are about three inches, and in structure they exactly resemble the mons veneris. The commissure at which they join is called the FOURCHETTE, (*c*.) It is

somewhat similar in appearance to the continuation of the skin at the roots of the fingers, and is the anterior boundary of the perineum.

THE PERINEUM (*d*) extends from the lower union of the labia externa back towards the anus (*e*). Its structure is principally made up of highly distensible cellular membrane; it does not possess in its substance a great deal of fat, and the skin is but scantily furnished with hair. Its length is about an inch or an inch and a quarter in the quiescent state of the parts; but when the child's head is pressing externally in labour, it is capable of elongation to three, four, or even five inches; and in the same degree that it is extended in surface it becomes thinned in substance. It is to this part of the body that the obstetrician, during natural labour, is required to direct a principal part of his attention, for the purpose of preventing laceration and injury. These parts, closing and surrounding the genital fissure, altogether constitute the PUDENDUM.

On separating the labia externa, a line of demarcation is distinctly evident in each, where the skin of the body terminates, and the mucous membrane investing the organs within commences. This continuation of the mucous into the cuticular structure is exactly similar to the arrangement observable in the openings of other cavities—as the anus, nose, and male urethra. A hollow is also observed, which in the virgin is bounded posteriorly by the hymen. This has obtained the name of CONCHA, or FOSSA NAVICULARIS, and it contains within its precincts the clitoris with its prepuce, the nymphæ, the vestibule, and the meatus urinarius. The whole of the external parts together, as well those that are lined by mucous membrane, as those covered by the common cuticle, are called the VULVA.

THE CLITORIS, (*f*), or rather that portion of it which is visible, is placed rather above and anterior to the lower

edge of the symphysis pubis. In formation it bears a great analogy to the male penis: it resembles it, indeed, in every respect except two—its small size, and its not being permeated by the urethra. Like the male penis it is composed of *two crura*, which arise from the rami of the ischia and pubes, one on each side, run up to the junction of the bones at the symphysis, and there form the *corpora cavernosa*. These are also furnished with two muscles resembling the *erectores penis* in the male. At the extremity of the *corpora cavernosa* is placed the *glans*; this is the only part of the organ that we can observe by the eye, the others being embedded between the mucous membrane and the bone. Above the *glans* projects a duplicature or fold of membrane, covering it like a hood—apparently for the purpose of protection—the *PREPUTIUM CLITORIDIS*, (*g.*) The clitoris is the most sensitive part of all the external organs. It is capable of distension, as the male penis is. It is liberally supplied with blood from the pudic artery; and with nerves from branches of the pudic fasciculi.

Taking their origin from the clitoris, and sometimes arising from its prepuce, there are two other distinct folds of mucous membrane, which run parallel to the *labia externa*—the *NYMPHÆ*, OR *LABIA INTERNA* (*h.*) They are nothing more than membranous rugæ—two layers connected by cellular substance—and at their termination they are ultimately lost in the lining membrane of the parts. They are mechanically opened out during the passage of the foetal head in labour, and, by affording an increase of surface, assist in preventing laceration of the membrane.

Between the two *nymphæ*, running downwards and inwards round the lower edge of the symphysis pubis, and leading directly to the *meatus urinarius*, a smooth groove, of about an inch in length, is situated, termed

the VESTIBULE, (*i.*) The surgeon will find it highly necessary to pay attention to this furrowed depression, because in the introduction of the catheter it guides his finger to the entrance of the urethra.

THE MEATUS URINARIUS, (*k.*) the mouth of the urethra, which is the canal leading to the bladder, is situated at the further extremity of the vestibule. It is a small closed aperture, capable of admitting with ease the barrel of a goose quill; and is so distensible that a much larger cylinder can be introduced. It is essential that we become acquainted, not only with the situation of this aperture, but with the character which it affords to the touch; because when the bladder requires to be artificially evacuated, it is most desirable that the instrument used for that purpose should be passed in by the aid of the finger alone, without exposing the woman's person to the eye. This operation is frequently required, as well under labour as under different states of organic disease and functional derangement. In the more natural state of the parts we shall find the meatus to consist of an eminent, soft, circular rim, with a central depression, that would appear scarcely large enough to permit the insertion of a small wire; and if its position is borne in mind, a little practice will enable the student to introduce the catheter with facility. But when the structures are pressed upon by a long-continued lodgment of the child's head in the pelvis under labour, such a confusion is occasioned by their extension or tumefaction, that the peculiar character of this part is lost, and much difficulty may be experienced both in detecting it, and guiding the instrument into it. In such case, it is infinitely better to expose the patient to the inconvenience of an ocular inspection than to allow the bladder to become overcharged, to the imminent risk of its bursting, or to the no less probable chance of a fistulous orifice being formed between its neck and the vagina.

THE HYMEN* (*l*) is the posterior boundary of the fossa navicularis, and, placed at the entrance of the vagina, it divides the external from the internal organs. It consists of a very delicate membrane, generally of a semi-lunar shape, stretched directly across the parts, and having an aperture anteriorly. Sometimes, however, the opening is central, and serrated on its inner edge; at others, it possesses a number of small punctures, it is then called *cribriform*; and at others it is impervious, in which state, on the accession of puberty, it gives rise to many very distressing and dangerous symptoms, consequent on the retention behind it of the menstrual and other secretions.

It is usually ruptured on the first sexual access, but by no means universally so. Upon its destruction the membrane disappears, and has been supposed to dwindle into a number of little eminences, which have been called, from their fancied resemblance to myrtle-berries, the *CARUNCULÆ MYRTIFORMES*. Lately, however, it has been doubted whether these carunculæ were really the remains of the broken hymen; for it has been demonstrated by some physiologists, that both the hymen and carunculæ may exist together in the same subject, and that therefore they are perfectly independent formations.

Although the presence of the hymen was formerly considered as a test of virginity, from the supposition that it was invariably broken on the consummation of matrimonial intercourse, this idea has long been repudiated; for

* The name hymen was adopted after the Greek word ὕμην, a membrane. From its bearing most frequently a crescent shape, this membrane has been fancifully pictured as the origin of the characteristic symbol of the virgin goddess Diana, as though she carried on her brow the stamp of her purity. It is a pretty poetical idea, but we can trace her typical figure to a much more probable source. Diana, in the beautiful poetry of the heathen mythology, was generally identified with Luna; and it is by far more likely that she derived this distinctive emblem from the crescent moon.

it is now well known, not only that it may be destroyed and lost from numerous causes originating in disease or accident, but also that in some instances it does not give way upon the first nor many subsequent connexions, and even that pregnancy has taken place while this membrane was entire. So that its presence can be no proof of personal chastity, nor its absence of immorality.

All the organs immediately within the genital fissure are profusely supplied with blood from branches of the internal iliac arteries, and with nervous influence from the pudic filaments. The absorbent vessels, also, are both large and numerous, and communicate with the sacral and inguinal glands.

INTERNAL ORGANS.

THE VAGINA (plate 15 *k.*, and 18 *r.*) is a musculo-membranous canal, running up the centre of the pelvis, leading from the external parts to the os uteri, in its progress describing a curve even greater than that of the sacrum and coxyx, having the neck of the bladder, the urethra, and the symphysis pubis anteriorly, and the rectum behind it. In length it is about four or five inches; in circumference about three. It varies much, however, in different subjects, and is capable of extension to an extraordinary degree. In married women, and those who have had a family, it is considerably more capacious than in virgins; it is also wider in the middle than at either extremity, and longer on its posterior surface than anteriorly. It is composed of three coats—an external, cellular; a middle, muscular; and an internal, mucous. The external coat is merely a collection of condensed cellular structure, by which it is attached to the parts surrounding it. The middle coat is muscular, and the fibres follow different directions; some are longitudinal, some transverse, and some oblique. The muscular fibres are much more numerous at the commence-

ment of the vagina than at any other part. Here they seem arranged in concentric circles, taking their origin from the sphincter ani, to which formation anatomists have given the name of *sphincter vaginæ*. The internal coat is mucous, and is a continuation of the membrane which lines the external parts; it is collected into transverse, or rather oblique rugæ; and from this circumstance it has also obtained the name of the *rugous coat* of the vagina.

These folds are much more apparent in the virgin, than in women who have borne children; and, like the muscular fibres, they are found in the greatest number at the lower end near the commencement. In the interstices of the rugæ are placed a number of follicles, which, independently of the mucus poured out by the vessels proper to the membrane itself, secrete a fluid of a peculiar character. The membrane is puckered thus, principally for the purpose of allowing the distension of the vagina during the passage of the child's head. The vaginal canal becomes much contracted in advanced life, and even in the virgin presents a smooth surface within, instead of the plicated membrane.

This organ is very plentifully supplied with blood-vessels, with nervous filaments, and absorbents. It obtains its blood through branches of the two uterine arteries, which are given off from the internal iliacs or hypogastrics. The common iliacs divide into two channels, the external and internal; the internal descend into the pelvis, over the sacro-iliac syncondroses. From them arise the uterine arteries, which run up one on each side of the vagina, and in their course give off many transverse branches, which supply the vagina itself. Its nerves are principally derived from the sacral plexus; its veins accompany the arteries, and the absorbents pass in two directions, one division to the glands in the sacrum, and the other to those in the groin. The vagina is connected

below with the external parts by a continuation of structure; anteriorly, with the symphysis pubis, the urethra, and the neck of the bladder, by cellular membrane; above, with the cervix uteri, and behind it is attached to the rectum. The commissure connecting the two organs is called by anatomists the *recto-vaginal septum*. It runs down, in connexion with the rectum, through a great part of its extent; but the vagina, at its lower end, turns at an angle forwards; while the rectum, just before terminating in the anus, is directed somewhat backwards, so that a space of about an inch in extent is left between them—the perineum.

The secretion of the vaginal membrane, in the ordinary healthy state of the parts, is almost exactly balanced by the natural absorption, so that there is little or no exudation externally; but under peculiar states of excitement under some diseases also, as well as under labour, the secretion much exceeds the absorption, and a discharge appears outwardly.

At the upper part of the vagina, hanging in the centre of the pelvis, behind the bladder and before the rectum, with its superior edge somewhat peeping up above the brim of the pelvis; supported in this situation by two ligaments which run from its sides to the ilea, and by the vagina, which is below, is situated the UTERUS,* MATRIX, or WOMB, the organ destined to receive, to afford lodgment and nourishment to, and eventually to expel the ovum.

In shape the uterus is somewhat triangular, or rather like a flattened pear; and it is observed to be rounder on its posterior face than anteriorly, from which circumstance, in the unimpregnated state, we can always distinguish the right from the left side. In length it is about three inches; in width, at the widest part, it is about two; and in thickness pretty nearly an inch. It

* Derived from the Greek *ὑστέρα*.

varies, however, in different subjects, being in some degree larger in women who have borne many children, and smaller in virgins. Anatomists, for the facility of teaching, describe it as though it consisted of four parts; to the upper third they give the name of *fundus*, to the middle the name of *body*, and to the lower third that of *neck*; while its opening into the vagina they designate the *os uteri*, or *mouth of the womb*. The three first of these divisions are perfectly arbitrary; there is no septum in the uterus, no line of demarcation either externally or within, by which we can point out their limits; not so, however, with regard to the *os uteri*, which is the means of its communication with the vagina—a natural aperture. Plate 16, fig. 1, shows the longitudinal section of the uterus; *a*, the fundus uteri; *b*, its body; *c*, the cervix; *d*, the *os uteri*; *e*, a small portion of the upper part of the vagina. The central line shows the direction of the cavity.

The uterus is covered externally by the peritoneum; it has a cavity which is lined by mucous membrane, and a peculiar parenchymatous structure between the two. The peritoneum, after having lined the abdominal muscles, rises over the bladder, giving a covering to a very considerable portion of that viscus; it then passes from the neck of the bladder directly backwards to the cervix uteri; it mounts over the uterus, and descends on the back part somewhat lower than in front, dipping even a little beneath the *os uteri*, affording an external coat to a very small portion of the vagina, and separating the uterus entirely from the rectum; it is then continued from the upper part of the vagina to the lower gut, and ascends to embrace the bowels. From the sides of the uterus processes are sent off, which constitute the broad ligaments.

The parenchymatous structure of this organ is of a very dense character, in appearance much resembling a

half-tanned hide. On making a section of it, we observe a great number of very minute tortuous vessels running throughout its whole substance; in the unimpregnated state they are scarcely capacious enough to receive the finest injection; but they take upon themselves a process of growth as soon as conception has occurred; and towards the end of pregnancy many of them are sufficiently large in calibre to admit the introduction of a goose quill.

The uterus is generally considered by anatomists of the present day as a muscular organ; and, although this has been doubted by some respectable physiologists, it is now usually classed among the hollow muscles of the body.

This viscus contains a cavity which is lined by mucous membrane, being a continuation of that lining the vagina. The membrane is puckered into longitudinal or arborescent striæ towards the mouth of the womb, more evident in the virgin than in women who have had children (plate 16, fig. 3, *b*). This formation is denominated the *arbor vitæ*. In the infant, the whole inner membrane is corrugated.

Figure 2 shows the infantile uterus laid open; *a*, the inner membrane of the uterus; *b*, the os uteri; *c*, the upper part of the vagina.

The cavity of the uterus is somewhat similar in shape to its external form; it is rather triangular, and large enough to contain a split almond. Into it three apertures open;—two at the angles of the fundus, the uterine extremities of the fallopian tubes, and one below, communicating with the vagina—the mouth of the womb. The fallopian tubes do not enter the uterus in a straight line, opposite to each other, but obliquely; from which arrangement two bristles passed along the tubes cross each other at a considerable angle when received into the cavity. Fig. 3 displays the uterine cavity laid open;—*a*, the os uteri; *b*, the cervix; the longitudinal lines show the appearance called *arbor*

vitæ; *c*, the uterine extremities of the fallopian tubes, with a bristle inserted into each.

The opening into the vagina is called the *os uteri*, *os tincæ*,* *os internum*, or the *mouth of the womb*, and by it a free communication is permitted between the cavities of the vagina and the uterus. But it must not be supposed that the uterus is connected with the vagina by a direct continuation of their separate structures; on the contrary, the vaginal coats run up a few lines above the orifice, to terminate at the cervix uteri; and the mucous membrane is reflected over its mouth, to line it within; so that the *os uteri* pouts and projects somewhat into the vagina, at an angle, looking considerably backwards, towards the centre of the hollow of the sacrum (plate 18, *q*). In the adult subject, the *os uteri* is of an oval shape, the slit being lateral, so that it is divided into an anterior and posterior lip. In the virgin it will with difficulty admit the extremity of a flattened catheter; but it is generally more dilated in women who have had children, in whom also it is often fissured. Thickly studding the *os uteri*, as also the cervix, we observe a number of follicles, called *glandulæ Nabothi* (plate 28, figs. 1, 2, 3). These are scarcely perceptible in the healthy uterus of the virgin; but they enlarge much under pregnancy, during which state they become very evident to the eye. With this increase of size, a new office is afforded them; they pour out a thick, tough, pellucid, gelatinous mucus in considerable quantities, which blocks up the entrance to the cavity of the uterus, and breaks off the communication between it and the vagina; and as long as this mucus remains *in situ*, no fluid can be injected into the uterus. Plate 27 is designed to show the appearance of this mucus at the cervix uteri.

The uterus is very liberally supplied with blood-vessels,

* *Os tincæ*, from its fancied resemblance to the mouth of a tench fish.

with nerves and absorbents. The arteries are from two sources; one set, the *spermatic*, descend from the aorta, below the renal arteries, sometimes by one trunk from the anterior part of that vessel, and sometimes by two, one on each side: at others, they have been known to take their origin from the renal arteries. They descend with the same tortuous inflections as the spermatic vessels in the male, supply the ovaries, and afterwards run along the broad ligaments, to expend themselves in the uterus;—the other, the *uterine*, are given off from the internal iliacs, and anastomose very freely with the uterine branches of the spermatic. By these two sets of vessels, a very copious supply of blood is allowed—one originating high up in the loins, and the other low down in the pelvis. The veins follow the course of their respective arteries. The spermatic have the same termination as the spermatic veins in the male—the right in the inferior cava, the left in the renal vein. The uterine veins empty themselves into the internal iliacs. The nerves also are from two sources: one supply is derived from the sacral plexus of the cerebro-spinal system, the other from the great sympathetic; and it is through the filaments of the latter nerve that most of the vital organs of the body, especially the stomach, sympathise so completely with the uterus, as well under disease as under pregnancy. The absorbents also run in two directions, one into the lumbar and sacral glands, and the other through the round ligament into the glands of the groin. The connexions of this organ are with the sides of the pelvis, by the broad ligaments which principally support it; with the vagina inferiorly; with the neck of the bladder anteriorly, by cellular substance; and with the groin, by means of the round ligament. It cannot be said to be connected with the rectum, because the peritoneum dips down suffi-

ciently low to separate it perfectly from that gut, giving an outward tunic to a small portion of the upper part of the vagina. In this respect the posterior differs materially from the anterior surface of the uterus, because there is a direct connexion in front between the cervix uteri and the neck of the bladder by cellular tissue.

From each side of the uterus two duplicatures of the peritoneum extend to the ilea. They are called the BROAD LIGAMENTS, and sometimes, from their shape—since they are fancifully supposed to spread out somewhat like the wings of a bat—the ALÆ VESPERTILIONIS. They contain the fallopian tubes, which run on their upper margin; the ovaries, which are enclosed in a posterior fold; the round ligaments on their anterior face; and blood-vessels, nerves, and absorbents, destined to supply the uterus itself. These ligaments are well seen in plate 15, *e e*; the right is shown in plate 18, *m*. There is also another double extension of the peritoneum on each side, not usually described by anatomists, arising from the angle of the fundus uteri, and running backwards to the sacrum and lumbar vertebræ. These, in conjunction with the lateral ligaments, are for the purpose of supporting the uterus in its situation, while hanging in the centre of the pelvis, and of guiding it in its ascent to the abdomen during the middle months of pregnancy (plate 19, *h h*).

Dangling somewhat loosely between the duplicatures of the broad ligament posteriorly, at the distance of about an inch and a half from the edge of the uterus, on each side, are placed the OVARIA (plate 15, *i i*, 18 *l l*, and 19 *g g*). They are oval, glandular bodies, about the size of a large almond; and previously to the time of Steno, who first asserted that they were analogous to true ovaria, they were called the FEMALE TESTES. Enclosed within

this fold, they obtain their external covering from the peritoneum; their surface in consequence is smooth and shining. Besides the peritoneal coat, they possess beneath it another,—their proper tunic; and an impervious cord extends from each to the side of the uterus,—the ligament of the ovary. When a section is made, their structure is found to consist of dense cellular tissue, in which is embedded a number of small cavities or vesicles, varying in size from the minutest pin's head to that of a large shot, the lesser being within, the larger more towards the surface. The fluid which these cavities contain is pellucid and coagulable by alcohol, heat, and the strong acids—composed, therefore, principally of albumen. In number they vary from twelve to fifteen in each ovarium. They are called, after De Graaf, *vesiculæ Graafianæ*. We may remark them sometimes rather eminent upon the surface. In the course of my dissections, I have occasionally seen two or three projecting under the peritoneum, studding the external face of the gland like beautiful little pearls, and on pricking them the fluid has exuded. We do not see these vesicles at all before puberty; they disappear, or become altered towards the close of life, when the gland is shrivelled by age; and are found in the greatest number, and most apparent, in the adult virgin. The *vesiculæ Graafianæ* contain whatever the female supplies towards the formation of the embryo. The late researches, indeed, of the talented and indefatigable Baer have detected in the vesicle before impregnation a minute body of spheroidal shape, which is admitted by those physiologists who have most deeply studied the subject since this discovery was made, to be perfectly similar in all its essential qualities to the ovum of birds and other ovipara. It is presumed to be the germ from whence will spring the future man, being vivified by the mysterious agency of the male semen during the process of conception.

Corpus Luteum.—In the ovary of a woman recently pregnant, we observe, besides these vesicles, a vascular spot about the size of a large pea or small bean, containing a central cavity, sometimes empty, at others filled with coagula, the consequence of the late conception. It is somewhat fabiform, of a dull yellow tint, resembling in hue the buffy coat of the blood, and when newly exposed, slightly red. The name CORPUS LUTEUM was given to it by Malpighi, from its colour; it had been previously called by De Graaf CORPUS GLANDULOSUM, for it possesses much of a gland-like appearance. Hunter, indeed, described it as “tender and friable, like glandular flesh.” Røederer compares its structure to that of the supra-renal capsules of the fœtus; and Montgomery speaks of it as “obviously and strikingly glandular.” Corresponding with its situation externally there is observable a distinct cicatrix on the surface of the ovary, indicating the spot through which the fluid contained in the Graafian vesicle has escaped into the fallopian tube. The aperture has, in some rare instances, been found still pervious, when the conception was very recent.

The corpus luteum will present different appearances according to the length of time that has elapsed since impregnation. In the early weeks, that portion of peritoneum which covers it projects considerably beyond the surrounding surface, and minute vessels are seen ramifying over it (plate 17, fig. 2). On dividing it, the central cavity is clearly distinguishable, of a tolerably regular, circular figure, around which is deposited the peculiar substance that forms its principal, essential constituent—yellowish, and possessing numerous thread-like vessels ramifying through it (fig. 3). As gestation advances, the regularity of the central cavity is destroyed (figs. 4 and 5); it diminishes in size; the newly-secreted yellow matter becomes plicated and absorbed, till at last the walls of the cyst, gradually collapsing, are

brought into close contact, and a radiated or star-shaped series of lines is all that remains of the former cavity (fig. 6). During this process, both the vascularity and external projection are day by day decreasing, and the ovary is being restored to its former volume and appearance.

The length of time during which the corpus luteum continues visible, is not exactly ascertained, and probably it varies considerably according to circumstances. Montgomery has found the central cavity existing in the sixth month from impregnation; and the corpus luteum distinguishable at the end of five months from mature delivery, but never beyond that time. From the observations of Dr. Paterson, indeed, (*Edin. Med. Journal*, Jan. 1840,) it would appear that positive evidence of the existence of this body is rarely met with, even three or four months after labour; so that the common idea that this is a permanent structure, and that an examination of the ovaries after death will enable us to tell the exact number of children which any woman has borne, from the number of corpora lutea existing in her ovaries, is quite erroneous.

The formation of this body is explained in the following manner. It has been demonstrated that the Graafian vesicle possesses two membranes, one adhering to the substance of the ovary, the other enclosing the fluid in which the ovule of Baer floats. When a fruitful connexion takes place, a great determination of blood is made to that ovary which supplies the germ. The gland becomes larger, rounder, and more vascular, than the other; to the touch it feels fuller and softer. But the vascularity is confined to one spot,—the neighbourhood of the corpus luteum; and the increased size and softness result not so much from an alteration in the structure of the whole organ, as from the quantity of lymph and fluid blood deposited between the membranes of the vesicle, which is converted into

the characteristic yellow gland-like mass.* This effusion causes the vesicle to be thrown prominently out towards the peritoneal surface; the attenuated coats burst, or rather an opening is formed by absorption, and the fluid previously contained within them passes into the tube.

False Corpora Lutea. The remark of Haller, that “*conception never happens without the production of a corpus luteum,*” has, I believe, never been disputed; but his other proposition, that “*the corpus luteum is never found in virgin animals, but is the effect of impregnation alone,*” has been canvassed very extensively. Some physiologists have supposed that true corpora lutea, or bodies analogous in appearance to them, can be formed in the ovaries of virgins; while others have expressed themselves so vaguely on the subject, as to leave their opinions in great doubt. The possibility of such an occurrence is a question of first-rate importance in many medico-legal investigations; and consequently it is incumbent on every one who touches upon this subject to endeavour to put it in a clear light.

It is perfectly true that spots of various size, shape, colour, and consistence, are met with in the virgin ovary of all animals, differing essentially from the surrounding tissue; but it is equally true that in structure they are very unlike that new product, the result of impregnation; and with care the one may always be distinguished from the other. The *real corpus luteum*, in the early weeks after conception, possesses a tolerably regular circular cavity, sometimes unoccupied, at others filled with the blood which was extravasated at the time when the coats of the vesicle gave way—at the moment, indeed, of impregnation. It is vascular, and its vascularity may

* Professor Baer, *De Ovi Mammalium et Hominis Genesi*, thinks that the corpus luteum is produced by a thickening of the inner membrane of the Graafian vesicle; and Dr. R. Lec, *Med. Chirurg. Trans.*, vol. xxii., that it is formed outside of both the membranes. My own opinion coincides with that of Drs. Montgomery and Paterson.

be shown by injection. Its two coats may be distinctly traced, and the buff-coloured, lymphic deposit, in which newly-formed vessels ramify, may be observed between them (fig. 3). One only is ever found at the same time except the woman had conceived of twins, or had aborted very lately, before the last impregnation. The ovary on its external surface, above the spot where the body is situated within, is vascular and more prominent than at the other parts (fig. 2). There is a cicatrix very evident at the same point. In the more advanced stage, the central cavity is contracted, and at length becomes destroyed, and in its place is seen the radiated or stellated lines already mentioned, which is then its best distinguishing mark, (fig. 6). The luteum itself diminishes in size in proportion to the distance of time from conception.

On the contrary, the *spurious, false, or virgin corpora lutea*, as they have been incorrectly termed, are of various shapes, sometimes triangular, at others square, offering no regular or definite figure (fig. 7). They have no vessels in their substance, and consequently cannot be injected (fig. 8). Although they possess two coats, they are entirely destitute of the interstitial, lymphic deposit. Their texture is often so wanting in firmness, as to be easily broken down. Several are frequently found in both ovaries at the same time. The peritoneum covering them does not present either prominence, or any appearance of vascularity, and the external cicatrix is seldom met with. They never contain the perfectly-regular central cavity, nor the stelliform, or radiated white lines, which result from the closing of the cavity.*

* The drawings in this plate are copied from Montgomery's excellent work on the Signs and Symptoms of Pregnancy, and are of the natural size. Figs. 1, 2, 3, are taken from the ovaries of a woman who died when three months pregnant. Fig. 1 shows the appearance of that which had not contributed to conception; fig. 2, the external surface of the one which had furnished the germ, and which is enlarged by containing the corpus luteum.

In advanced life, the ovaries become shrivelled, corrugated on their surface, firmer in their texture, and often contain empty collapsed cysts, with thickened, opake coats, so strong that they can be turned out of their bed entire. These have been mistaken for, and described as, corpora lutea ; but after the account already given, it must be evident that such is not the case. There is little doubt that they are Graafian vesicles altered by age.

That the ovarium supplies whatever the female provides towards the formation of the new being, is proved by spaying animals, an operation which consists in taking away the ovaries. If one ovary only is removed from a multiparient animal, she becomes less fruitful. Hunter, after having deprived a sow of one, found that she furrowed six less than another animal of the same age. But when both these bodies are removed, the subject has no longer any desire for copulation, loses the characteristics of her sex, and assumes more or less those of the male. This is remarked in all animals, but is particularly observable in the feathered tribes. If the ovaries be removed from a common domestic hen, she soon becomes decked with somewhat of the cock's plumage,

The vascularity of that portion surmounting the corpus luteum is beautifully displayed. In fig. 3 the same ovary is opened, and shows its internal structure, the lymph effused between the coats, its high vascularity, and its central cavity, which had previously contained the fluid. Fig. 4 is the corpus luteum in the fourth month opened, showing the vessels running through its substance, and the central cavity unusually large for that period of gestation. Fig. 6, the appearance in the sixth month, the corpus luteum still retaining its central cavity, which is unusual at so late a period. Fig. 5, the ovary of a woman who died sixteen days after mature delivery, exhibiting the corpus luteum with its stellated central white line, and a few small vessels in its structure. Fig. 7, an ovary opened, containing spurious or virgin corpora lutea, which possess neither the appearance of a separated double membrane, nor stellated lines, nor any vessels in their structure. Fig. 8 is also an ovary containing spurious corpora lutea. It was injected with eare, but none of the colouring matter entered the spurious products, which were destitute of vessels.

her voice is changed, and instead of her usual cackle, she utters an imperfect crow. The female of the human subject ceases to menstruate; long straggling hairs grow upon the chin; the breasts become flabby, being deprived of part both of their fat and glandular structure; the skin loses its soft smoothness; the voice becomes harsh and discordant; and the individual might easily be mistaken for a male. Nor are the moral less influenced than the physical properties: sexual feelings are destroyed, and the delicacy of the female character disappears. This change was strictly exemplified in Mr. Pott's celebrated case, where both ovaries were removed in an operation for hernia. Similar results, indeed, take place, as are observed after castration of the male: so that to the presence of these little glands the female is as much indebted for the distinctive physical marks and moral attributes of her sex, as the male is to the possession of the testes.

Although I have followed the ordinary usage in describing the ovaries as appendages to the uterus, the uterus ought in truth to be considered as an appendage to them; in the same way as the penis may be considered an appendage to the testes. For they are the most essential organs in the function of generation. The uterus may be diseased to a great extent, and yet the woman may be fruitful; but if both these glands are much altered in structure, barrenness necessarily ensues. An ovary, indeed, or something analogous to it, is found throughout the whole of the sexual genera of both animals and plants.

Running along the upper edge of each broad ligament there is a pervious canal, having two open extremities—one end communicating with the uterine, the other with the peritoneal cavities: to these the name of FALLOPIAN TUBES has been given, after their first describer. They are about four inches in length; they are covered exter-

nally by the peritoneum: possess a middle coat of muscular fibres, which run longitudinally, transversely, and obliquely, and an internal mucous coat, a continuation of the mucous membrane lining the uterus. At the abdominal extremity they are fringed, (plate 15, *h.* ; 18, *o. o.* ; 19, *f. f.*) and float loose and unconnected ;—this part of the tube is called the *fimbriated* extremity, and in old works, from its office, the *morsus Diaboli*. The mucous membrane which lines the tube is continued to the *fimbriæ*, and it is the only instance in the body where a mucous and a serous membrane join by continuation of structure—the only example of a mucous membrane terminating in a shut cavity.

It is through this tube that the ovum, after impregnation, passes into the uterine cavity; and the mode in which it is affected is supposed to be the following. By its own inherent muscular power, the Fallopian tube under the venereal orgasm, erects itself somewhat like a snake raising its crest. By the same inherent muscular power it directs itself to the ovarium, it widely spreads its *fimbriæ*, expands itself upon the external surface of the gland, closely embraces it, and squeezes from it the contents of one or more of the vesicles of De Graaf. (Plate 15, *i.*) Freighted with their living burthen, the *fimbriæ* approximate each other, close the orifice, before wide spreading and patulous; and a motion somewhat like the peristaltic action of the intestinal canal is then set up in the tube, by which means the ovum, now impregnated, traverses the length of the canal until it drops into the uterine cavity. We have both negative and positive proof of the strongest kind, that the ovum passes through the Fallopian tube before it arrives at the uterus—*negative*, because there is no other canal through which it can be conveyed, there being no direct communication between the ovarium and the uterus; *negative*, also, because, if we cut away a portion of the Fallopian tube

from each side, so as to destroy the continuity of the canal, we prevent conception, although we do not take away the desire for copulation;—but further, we have *positive* proof, because an impregnated ovum has been frequently found within the tube; it has been arrested in its transit, formed a bed for itself within the dilated canal, and there grown; constituting a species of that disease termed *extra-uterine conception*. Thus we cannot for a moment doubt that the ovum travels along the Fallopian tube to gain the uterine cavity. The sensation communicated to the finger by squeezing the tube is very much like that of the spermatic cord. It is hard, firm, and wiry. In its office it may be assimilated to the vas deferens of the male.

THE ROUND LIGAMENTS are two small circular cords, which, arising from the angle of the uterus at its sides, anterior to and rather below the Fallopian tubes, run between the duplicatures of the peritoneum, constituting the broad ligaments, until they arrive at the sides of the pelvis. They then leave the broad ligaments, and, turning forwards, take their course round just below the brim, eventually pass out at the ring of the external oblique muscle, and are lost in the groin and parts adjacent. They consist of a congeries of blood-vessels, nerves, and absorbents; and by them a communication is kept up between the uterus within the pelvis and the structures on the outside. It is in consequence of this direct communication, that, in some of the malignant diseases of the uterus, the glands in the groin take upon themselves unhealthy action, and become enlarged, indurated, and occasionally ulcerated.

The round ligaments are figured in plate 15 *ff*, also one in plate 18 *p*., and particularly well shown in plate 19 *ii*, where their origin, course, and escape through the ring may be clearly traced.

Plate 15 shows the back face of the vagina, the uterus,

and its appendages. On the left side, the peritoneum is dissected off the body of the uterus, to display the round ligament more fully. The fimbriated extremity of the left Fallopian tube is spread upon and embracing the ovary of that side, as happens during conception. *a* the fundus uteri, *b* its body, *c* the neck, *d* the mouth, *ee* the broad ligaments, *ff* the round ligaments, *gg* the Fallopian tubes, *h* the fimbriated extremity of the right side, *ii* the ovaries, *k* the vagina split up, to show the rugæ on its posterior surface.

Plate 18 represents the left section of the female pelvis, drawn from a very accurate German model in my collection. *a* the fourth lumbar vertebra, *b* the rectum, *c* the left iliac fossa, *d* the rectus abdominis muscle, springing from *e* the symphysis pubis, *f* the mons veneris, *g* the clitoris, *h* the left nympha, *i* the left labium externum, *k* the fundus uteri, *ll* the ovaries brought upwards, *m* the posterior surface of the right broad ligament, *n* the right Fallopian tube turned downwards, *oo* the fimbriated extremities of the tubes, *p* the right round ligament—the dotted line crosses the fundus of the bladder, *q* the os uteri, *r* the vagina, *s* the point of the coxyx, *t* the sphincter ani, *v* the sphincter of the bladder, *w* the urethra—the dotted line crosses the perineum, *x* the meatus urinarius.

Plate 19 gives a good view of the flooring of the pelvis looking into it from the abdomen; it is taken from a cast also in my collection, modelled by the late Mr. Joshua Brookes. *a* the mons veneris, *b* the bladder, *c* the fundus uteri, *d* the rectum, *ee* the Fallopian tubes, *ff* their fimbriated extremities, *gg* the ovaries brought upwards into view, *hh* the posterior processes of the broad ligaments, *ii* the round ligaments running forwards to escape out of the pelvis at the ring, *k* the cæcum with its appendix vermiformis, *l* the small intestines, *m* the body of one of the lumbar vertebræ.

Plate 20 delineates the arteries of the uterus; it is

copied from one of Tiedemann's beautiful engravings. The patient from whom the drawing was taken died six days after mature delivery. *aa* the kidneys, *bb* the ureters, *c* the uterus, about the comparative size it is usually found six days after labour; it is turned forwards over the pubes, so that its posterior face is brought into view; *dd* the broad ligaments, *ee* the ovaries, *ff* the Fallopian tubes, *g* the rectum cut, *h* the aorta, *i* the superior mesenteric artery divided, *k* the inferior do., *ll* the renal, *mm* the common iliacs, *nn* the external do., *oo* the internal do., *pp* the uterine arising from the internal iliacs, *qq* the gluteal, *rr* the obturators, *ss* the internal pudic, *tt* the ischiatic, *uu* the lateral sacral, *ww* the circumflexa ilii, *x* the sacra media, *yy* the spermatics, arising from the aorta just below the renal; in this instance, as is most common, by two distinct branches.

The nerves particularly requiring our attention run in five divisions. 1st. There is a large cutaneous branch, which rises from the second and third lumbar nerves, traverses the iliac and psoas muscles, and following the spine of the ilium is expended on the integuments of the outer part of the thigh. This nerve is too high to suffer under labour, but it is liable to pressure during the last few weeks of pregnancy; the consequence of which is numbness in the track of its distribution. 2nd. The anterior crural nerve,—one of great magnitude,—takes its origin from the second, third, and fourth lumbar nerves, passes over the pelvic brim outside the femoral artery, to be distributed principally on the rectus femoris, and other flexors of the thigh. It is also out of the way of pressure under labour, but, like the cutaneous branches, may suffer towards the close of gestation, to such an extent as to produce cramp on the inner and fore parts of the thigh. 3rd. The obturator, which rises from the third and fourth lumbar nerves, runs round below the brim of the pelvis, and passes out at the upper part of the ob-

turator foramen. This is chiefly distributed to the adductor muscles of the thigh, and pressure on it sometimes occasions cramps on the inside of the thigh, at the commencement of labour, while the child's head is entering the brim. 4th. The great sciatic, the largest nerve in the body, is formed of the fourth and fifth lumbar, and the first, second, and third sacral nerves. It lies over the sacro-iliac symphysis, and passes out of the pelvis by the side of the pyriform muscle, through the large sacro-sciatic foramen, to be distributed to the posterior part of the thigh, and to supply the leg and foot. This nerve, situated at the back part of the pelvic cavity, and passing directly through it, is particularly exposed to pressure during child-birth; and it is not surprising that much inconvenience should result. Violent cramps in the extensor muscles of the thigh, and especially in the calf and plantar sole, are almost universally attendant on lingering labours, and often, also, on those of ordinary duration, during the time when the head is fully occupying the pelvic cavity. Such muscular spasms add much to the agony endured; they may sometimes be mitigated by pressure and hard friction over the part in pain. 5th. The fourth sacral is entirely expended on the parts within the pelvis and about the anus. The fifth is sometimes wanting, and is always very small. The pudic nerve which supplies the clitoris and other external organs is derived principally from the third sacral.

Thus, when first the uterus subsides, preparatory to its taking on expulsive action, the cutaneous and crural nerves suffer, causing numbness and pain in the fore and outer part of the thigh; when the head is passing through the brim the obturator may be pressed on, producing cramps on the inside of the thigh: when labour is well advanced, the sciatic can scarcely escape pressure; and more or less of cramp at the back part of the thigh, the calf of the leg, and sole of the foot, is the consequence.

Occasionally, indeed, lameness and partial paralysis continue for some time after. The varicose state of the veins, and anasarcaous swellings of the lower extremities, so common during pregnancy, also originate from pressure, and mostly disappear, or are much relieved, in a few days after the termination of the labour.

Plate 21, from Moreau's work, faithfully describes the course and distribution of the principal pelvic nerves; it is drawn from the body of a woman who died four days after labour. The left side of the pelvis is cut away, the division being made at the sacro-iliac symphysis, posteriorly, and at the ramus of the pubes in front, just at its outer extremity, before it divides into the two branches, horizontal and descending. The bladder collapsed is seen behind the pubes, the vagina and rectum are also well displayed, as is the uterus, large, from having so recently expelled a foetus. The left ovary is drawn up, and the fallopian tubes fore-shortened, to give a view of the spermatic vein *a*, and the spermatic artery *b*; *c* directs to the vena cava, *d* the aorta; *e e* cut portions of the inferior mesenteric nerves, branches of the great sympathetic; *f g* the fourth and fifth lumbar ganglia; *h i k* the first, second, and third sacral; *m m m* the sacral nerves cut which are to form the great sciatic; *n* a branch supplying the lower part of the rectum, which rises from the fourth sacral. Immediately below the bifurcation of the aorta, lying over the sacral promontory, a large plexus of nervous filaments is seen, which is called the superior hypogastric, or common uterine plexus; this is formed by the continuation of the inferior mesenteric nerve, and by branches from the lumbar ganglia; it chiefly supplies the uterus. On the side of the vagina, rather above its centre, there is visible another extensive plexus of nervous threads, spread out into a large number of irregular meshes; this is also formed from branches sent off

from the inferior mesenteric, and others from the lumbar and sacral ganglia, and from the sacral nerves, and supplies the upper part of the vagina and the lower portion of the uterus: this is the inferior hypogastric plexus. Branches arise from the lower sacral nerves, *m m*, to be distributed on the bladder, and lower part of the vagina, the vesical and vaginal nerves. Behind these nerves, and the inferior hypogastric plexus, the uterine artery may be observed running up the vagina, and giving off transverse branches to that organ. The pudic nerves are not shown here. It is evident that, since they emerge from the pelvis, and re-enter it, the pudic nerve on the side opened must be destroyed, when the pelvis is divided as this plate represents.

The muscles within the pelvis deserve notice; for, by being pressed on during the escape of the child's head, they are sometimes strained, and pain is experienced in moving the thigh, and in evacuating the rectum, for some days subsequent to labour. *The levator ani*, one on each side, of the shape of a fan, rises from the pubes just below the brim, the aponeurosis covering the obturator internus, and the spinous process of the ischium, passes down by the side of the vagina, and is inserted into the sphincter ani, as seen in plate 21. On dissecting away these fibres, we observe the *obturator internus*; which, taking its origin from the inner surface of the obturator ligament, and a portion of both the pubes and ischium in the neighbourhood of the foramen, sends off a tendon that, running round the ischium like a pulley, passes out of the pelvis through the small sacro-sciatic foramen, and is inserted into the fossa trochanterica at the root of the trochanter major. *The pyriformis* rises from the anterior surface of the second, third, and fourth divisions of the sacrum, escapes from the pelvis through the large sacro-sciatic foramen, and is also inserted into the fossa trochanterica,

near the insertion of the obturator. *The coxygeus* springs from the spinous process of the ischium, and is attached to the side of the coxyx through nearly its whole extent. *The transversus perinei* rises from the side of the tuber ischii, and is lost upon the sphincter ani, sphincter vaginae, and the structure of the perineum itself.

Analogy between the genital organs in the two sexes.—Although the organs of generation appear to be widely different in the two sexes, and indeed give them their distinctive characters ; yet there is seen, on closely comparing them, a great similarity, not only in function, but even in formation ; so that we cannot withhold our belief that they have both been fashioned on a common model. The resemblance between the ovaria and testes in office, form, organic elements, and original situation, is most striking. For the testes lie in the abdomen until about seven months of foetal life are passed, and they are both supplied by blood-vessels arising from the same source, and following the same track. The uterus has been likened to the prostate ; and it certainly bears a great similitude, in its position at least, during foetal life. The vasa deferentia and fallopian tubes resemble each other in function, and construction. The clitoris may be likened to the penis, and the labia to the scrotum. In many instances the confusion arising from this similitude is so remarkable that it is difficult to decide, particularly in infancy, to which sex the individual belongs. It must be observed, indeed, that the earlier the time chosen for making the comparison, the stronger will the resemblance be. The clitoris of a foetus of three months is as large as the penis of a male at the same age, and in a more recent period of intra-uterine existence the distinction of sex is by no means perceptible.

OF THE GRAVID UTERUS.

Contrast between the unimpregnated and gravid Uterus.

—When we compare the unimpregnated with the gravid uterus at the end of gestation, we should be inclined to doubt,—from the extraordinary alteration that has taken place during pregnancy—whether in reality they were not two perfectly distinct organs. We observe an amazing difference, indeed, in every essential attribute, particularly in *form, size, situation, texture, power, and contents.*

THE FORM has undergone great change: previously to impregnation it is somewhat triangular, or like a slightly compressed pear; at the end of gestation it is of an egg shape.

The alteration in SIZE is most remarkable; the virgin uterus measures not more than three inches in length, and two in breadth; when labour is near at hand, it is about thirteen inches long, and eight or nine across.

The unimpregnated uterus has been described as SITUATED WITHIN THE PELVIS, between the bladder and the rectum, sustained in its position by ligaments passing from it to the pelvic and lumbar bones. On the contrary, the gravid uterus has become an abdominal viscus; it fills a large portion of that cavity, stretches the muscles considerably, and is supported by the parietes in front and at the sides, and by the pelvic bones below.

THE TEXTURE of the unimpregnated uterus is close, tough, firm, and inelastic; the structure of the organ when gravid is loose, spongy, and distensible, capable of being drawn out to a considerable extent between the fingers without laceration of its substance. The looseness of its texture depends chiefly on the enormously increased size which its vessels have acquired during the development of the organ.

The unimpregnated uterus possesses no power but that of secreting, and assisting in the function of conception; the gravid womb possesses the power of affording lodgment to the embryo, nourishing, and eventually expelling it.

The section of the unimpregnated uterus displays an unoccupied cavity, communicating by an open mouth with the vagina below, having, therefore, properly speaking, no contents; while the gravid contains the *membrana decidua*, and the *ovum*; which latter consists of the *chorion*, the *amnion*, the *liquor amnii*, the *placenta*, the *funis umbilicalis*, the *fœtus*, and, in an early stage of pregnancy, the *vesicula umbilicalis*.

On opening the gravid uterus, besides the spongy character of its structure just adverted to, and the large size of its vessels, (which have acquired such a magnitude, that the veins have the term sinuses applied to them,) its thickness must necessarily become an object of observation. This varies considerably in different individuals; the substance is generally rather thicker than in the unimpregnated state; and in all instances the fibres are more apparent. Having completely divided the parietes, we cut down upon the

MEMBRANA DECIDUA OR CADUCA.*—This is an opaque

* These names were given to the membrane by Dr. Hunter (who was the first to demonstrate its two laminae) in consequence of its being shed from the uterus after labour, with other discharges. He also called the outer layer the *decidua vera* and the inner *decidua reflexa*. I prefer the terms employed by Dr. R. Lee, *decidua uteri* and *decidua ovuli*; because their adoption merely describes the situation and connexion of the two laminae, and does not involve any theory as to the formation of the inner layer, about which there is still considerable doubt. Of late it has been described by Chaussier under the title *epichorion*, from $\epsilon\pi\lambda$, above, and $\chi\omega\rho\acute{\iota}\omicron\nu$, the external ovular membrane; by Dutrochet *epione*, from $\epsilon\pi\lambda$, and $\omega\delta\nu$ the ovum; by Breschet *perione*, from $\pi\epsilon\rho\lambda$ around, and $\omega\delta\nu$; and by Velpeau *anhiste*, from α priv; and $\acute{\iota}\sigma\tau\omicron\varsigma$, a web. Velpeau uses this term to signify an inorganic substance, since he denies the organization of the membrane at any period of pregnancy.

membrane, lining the entire cavity, and in contact with the internal surface of the uterus throughout its whole extent. It is divisible into two layers, both together being not thicker than the nail, and is flocculent on that face which is attached to the uterus; smooth and plane on the one next the ovum;—so glossy, indeed, that it might be supposed to possess serous properties. But the most patient investigators have not been able to discover any formation in the decidua analogous to serous structure. It is highly vascular, is supplied with blood from the uterine vessels, and has a tenacity between true and false membrane. In the early period of pregnancy, the two layers are separated from each other, especially towards the fundus uteri, by a quantity of red coloured fluid, partly serous, and partly half coagulated, to which Breschet, who designates it sero-albuminous, has given the name of *hydropерione*.* As gestation advances, this fluid is gradually absorbed, and the two laminae come into close contact at every point, except where the placenta intervenes between them. For they are described as splitting at the edge of the placenta; and while one layer passes between it and the uterus, the other traverses the foetal face of the organ, being interposed between its substance and the chorion.

The deciduous membrane is a product of the uterus, and does not originate in the ovum. It is not a consti-

* The two layers of the deciduous membrane are well shown in plate 22, fig. 3. This ovum is about seven weeks old: *a* the decidua vera, or uteri; *b* decidua reflexa or ovuli; *c* chorion; *d* amnion; *e* funis umbilicalis; *f* embryo; *g* prolongation of the decidua uteri into the neck of the womb. In this specimen the inner layer of the decidua forms a shut sac, and there is no appearance of any prolongation of the outer layer into either Fallopian tube, nor of any apertures tallying with the commencement of the tubes. Fig. 2 shows the flocculent character of the surface of the membrane in contact with the uterus. Fig. 1, the smooth glossy face next the ovum. This piece of deciduous membrane was taken from an ovum of later date.

tuent part of the ovum, and is only connected with and subservient to the embryo as an uterine formation, the consequence of pregnancy. This is proved to be the case because, in extra-uterine gestation, although the ovum has never entered the uterus, this membrane is invariably formed within the uterine cavity. It is furnished by the uterine vessels, and its secretion commences immediately upon impregnation taking place ; so that even before the ovum can be discovered by the naked eye,—while it is yet traversing the Fallopian tube—the rudiments of the decidua may be found within the womb. At first it consists of a tenacious fluid ; and by degrees it assumes the character of a perfect, organized, tender membrane.

Hunter called the internal layer *decidua reflexa*, from the supposition that its production was the effect of the following process. He presumed that on the impregnated ovum arriving at the uterine extremity of the Fallopian tube, it meets with resistance from this membrane, lying stretched across the mouth of the tube ; that in its descent into the cavity, it carries the membrane before it, doubles it upon itself, and thus forms two layers from the original single one. Other physiologists of repute have also adopted Hunter's ideas ; but their correctness in this respect is very doubtful ; for a prolongation of the outer membrane has been frequently observed passing a little way into each Fallopian tube, which could not be the case were the internal merely a duplicature of the outer layer.*

Its value appears to be principally, if not entirely, confined to the first few weeks of pregnancy ; it would seem to be of little service towards the close.

* Granville, "Graphic Illustrations of Abortion," considers the decidua reflexa as an ovular membrane, and denominates it "the cortical membrane," "cortex ovi."

It is subservient both to the nutrition of the embryo, and to the preservation of its vitality; and thus, before the elaboration of the placenta, it seems to perform for the new being, functions analogous to those which, in an after stage, are carried on by the placenta itself.

When the ovum is first seen, it is completely surrounded by minute filamentous, mossy vessels, as with an efflorescence, which proceed from the chorion and embed themselves in the semi-fluid deciduous secretion; these have been called the *shaggy chorion*.* As it continues to grow, the chorion and amnion increase in extent, but the flocculent vessels do not increase in the same proportion. They now no longer surround it at all points, but are left, as it were, in one corner, and gradually become clustered together, to form the fleshy placenta; while the greater part of the ovum becomes as gradually enveloped by the thin pellucid membranes.

Plate 23, fig. 1, shows the filamentous vessels entirely surrounding the chorion. Fig. 2 *a* the same vessels thicker and more numerous at this point than at any other: they are being collected, by degrees, into one mass, for the formation of the placenta; *b* the chorion denuded of the shaggy vessels. Fig 3 *a* the pellucid membranes which have increased in extent, leaving the shaggy vessels collected into one mass, to form *b* the pla-

* Velpeau, Carus, Breschet, and other physiologists, think that these villi are not blood-vessels, because they cannot detect canals in them, even by powerful glasses; and Dr. Montgomery, in a paper in the 4th volume of Dublin Medical and Surgical Journal, says, "They seem to be merely spongioles and to act as suckers, by which the ovum is supported until its connexion with the uterus is more perfectly accomplished by the development of the vessels of the placenta." I look upon them as blood-vessels. They are very similar to the vascular tassels attached to the fœtal membranes which dip into the cups of the cotyledons in the gravid uterus of the cow and sheep, and which in those animals are most easily injected from the umbilical vessels. They are evidently for the purpose of nourishing the young ovum. Baillie (continuation of Hunter's description of the gravid uterus) says, probably some of them are lymphatics, though that has not been demonstrated.

centa; *c* the embryo seen through the membranes. This ovum is about eight weeks old, and is the most perfect specimen of so early a placenta I have yet seen. The drawing represents the appearance of the ovum when it was first expelled, distended with the amnial fluid.

Plate 27, from Hunter's splendid work on the gravid uterus, displays an ovum of five months age within the womb, which has been laid open; the vessels ramifying on the decidua ovuli are well delineated; and the gelatine secreted by the *gladulæ Nabothi* at the cervix uteri *a* is also tolerably distinctly pictured. One coil of the funis is seen twisted round the neck, and another round the left ancle.

As gestation advances, the deciduous membrane becomes thinner and less tenacious; and at the full period of pregnancy, it is very difficult to separate the two layers one from the other.

CHORION.—Having divided the decidua in our dissection, we arrive at the external membrane of the ovum, the CHORION; a thin, glistening, transparent membrane, much resembling the delicate serous tissues, very tough for its tenuity, enveloping and affording an external covering to the whole of the ovum, with the exception of the placenta, which is interposed between it and the uterus. It passes on the foetal face of the placenta, and gives a coat to that surface as well as to the funis umbilicalis.

It is a constituent part of the ovum from the remotest period of conception, because in extra-uterine pregnancy we find it, not in the uterus, as the deciduous membrane is, but enclosing the embryo itself. It possesses no blood-vessels evident to the naked eye; but we cannot deny its vascularity, since it is subject to disease, and in many of the mammalia may be readily injected. It is for the purpose of protecting the embryo in conjunction with the amnion, and of assisting to form both a bag

for containing the liquor amnii, and also a soft wedge by which the structures, during labour, may be dilated with the least possible chance of injury.

AMNION.—The chorion having been cut through, we next meet with the AMNION, another very thin, transparent, and tough membrane, in structure and appearance so similar to the chorion, that it is almost impossible to distinguish the one from the other. It is destitute of coloured vessels, but it too must possess vascularity; because, like its twin sister, it becomes thickened by disease, and because it enjoys in an eminent degree the power of secretion. It runs in contact with the chorion throughout its whole extent, except just at the placental extremity of the funis umbilicalis, where these membranes are separated; and to this formation the term *processus infundibuliformis* has been applied. It is connected with the chorion by means of an intermediate, transparent, gelatinous substance, of which there is sometimes a tolerably thick stratum. It gives an external coat to the foetal face of the placenta, and to the funis umbilicalis. On dividing the naval string, we find the chorion between the amnion and the proper substance of the funis itself. The placenta and funis, then, may be said to be behind the amnion and chorion, in the same way as the bowels are said to be behind the peritoneum. Its use is exactly analogous to that of the chorion, so far as affording a covering to the ovum is concerned; but it performs an additional distinct function in the secretion of the liquor amnii.

It is worthy of remark, that these conjoint membranes do not always possess the same degree of toughness; for we sometimes observe them in labour so exceedingly tender, that they break on the very first accession of pain; while at others, their firmness is so considerable that they remain entire much longer than they ought, and thus proportionably retard the delivery. In some few in-

stances, they have not been ruptured at all before the child's birth; but the ovum has been expelled whole, even when it has arrived within a few weeks of its maturity. Nor do they increase in density and strength in a relative proportion as the process of gestation advances: for even at the earliest age, they resist the application of moderate pressure; and at five or six months, they are often found as strong as they usually are at the expiration of the whole period: of the two membranes the amnion is by far the strongest.

In the first few weeks of gestation, the chorion and amnion are not in contact except at one point, there being a quantity of transparent watery fluid, resembling the liquor amnii, placed between them. This is gradually absorbed during the progress of pregnancy, until it entirely disappears. Sometimes, though rarely, there still remains some fluid between the membranes at the close of pregnancy, and this is what in labour is called the false waters. In plate 29, fig. 2, is delineated an ovum of about five weeks age, in which the outer sac, *a* the chorion, has been opened to display *b* the amnion enclosing the embryo, and *c* the vesicula umbilicalis. In this specimen, the chorion is of far greater extent than the amnion, and there existed a proportionate quantity of water between them. These two membranes are also beautifully shown in plate 24, representing an ovum of five months age. The foetus is enclosed within the amnion, which is unopened, and is separated both from the chorion and placenta, but still adherent to the placental extremity of the funis: *a* a portion of deciduous membrane, *b* the placenta, *c* the chorion, *d* the amnion with the foetus within it.

LIQUOR AMNII.—The chorion and amnion, as well as the two layers of the decidua, being opened, we penetrate into the centre of the ovum, and the liquor amnii

escapes. This is the name given to the waters surrounding the fœtus, in which it floats. The liquor amnii varies exceedingly at the end of gestation, both in its quantity and properties:—in quantity, from a few ounces to a gallon or more; in properties, from being perfectly pellucid and inodorous, to a thick, somewhat viscid, dirty fluid, nearly as dark as a strong infusion of coffee, and occasionally of a putrid odour. The usual appearance of the liquor amnii is that of rather dingy water, of a greenish or yellowish cast. It contains some salts, especially the muriate of soda, and phosphate of lime, and a free acid known as *amnic acid*, by some supposed to be benzoic acid. Urea has also been discovered in it; and sometimes a very small quantity of albumen is held in solution, as is evidenced by its becoming turbid on the application of heat.

The relative proportions between the quantity of the fluid and the size of the embryo differs much at different stages of pregnancy, being considerably greater in the earlier periods, and less at the advanced stage. Thus when the embryo is scarcely visible to the naked eye, there is from half a drachm to a drachm of water collected within the membranes. In plate 22, where the embryo is not so large as a small kidney-bean, there would be an ounce or more of liquor amnii; while at the end of gestation, when the fœtus weighs on an average nearly seven pounds, the amount of fluid seldom exceeds a quart. The quantity, therefore, though *positively* increasing with the growth of the ovum throughout the whole of gestation, is *relatively to the size of the fœtus* gradually diminishing.

The origin of this water has given rise to much controversy: it has been regarded as an excretion from the fœtal body,—either urine or perspiration. This, however, cannot be, because, as just observed, a quantity of fluid is

present before the embryo is visible ; and the relative proportion to the size of the fœtus at the different ages of pregnancy would also discountenance such an idea. It has been supposed to be a specific uterine secretion ; but in extra-uterine conception it is found surrounding the fœtus, and not within the uterine cavity. It is now generally regarded as a secretion or exudation from the inner surface of the amnion, supplied by innumerable colourless vessels, which ramify on that membrane.

Use.—Nor has its intention or use been a less fruitful ground of dispute. At one time it was supposed to have been formed for the purpose of nourishing the fœtus ; but this notion is very unphilosophical ;—because we can assign other most valuable uses to it ;—because we have no need of its agency in this respect, since there is a regular system of vessels connected with the fœtus, through which the means of increase can be supplied ;—because it is sometimes perfectly unfitted for nutriment, being turbid, and occasionally putrid ;—because it is proved by analysis to contain no nutritious properties, or if any, a very inconsiderable proportion ;—and because of the large relative quantity in the first few weeks of gestation. Besides, monstrosities have been brought forth without either œsophagus or digestive apparatus. Such a production could not have obtained nourishment by means of internal organs. These facts have led others to believe that it nourished the fœtus by absorption through the skin. This supposition is equally improbable, for many of the reasons just stated ; and to them may be added, that as the liquor amnii is secreted by the amnion, which is continuous with, and, as it were, an extension of, the foetal skin, we cannot concede to it the office of affording a nutritious matter to be afterwards absorbed by the cuticular vessels.

Its real use appears to be, to defend the young embryo, in the early weeks of pregnancy, from the pressure

of the uterine parietes, which must otherwise have annihilated it ; and this is the reason why it then exists in such large proportionate quantity ;—to protect the vessels of the funis and placenta in the latter months from a degree of compression which would have impeded the regular flow of blood through them ;—and to allow free motion to the limbs of the fœtus, so as to prevent them being cramped or distorted. It has also been supposed (since water is so bad a conductor of heat) to keep up an equable warmth in the fœtal body throughout the whole of gestation, to whatever varying circumstances of temperature the woman's person may be exposed. Besides these advantages, we find it performing a most important service in labour, when it conduces so essentially to the formation of the soft wedge-like bag. Its value does not cease even on the rupture of the membranes ; for it assists in lubricating the vagina and external parts, and by this means prepares them for the more easy passage of the child.

PLACENTA.—Of the fœtal appendages—all of them highly essential towards the well being of the ovum, either at the early or more advanced period of intra-uterine life—the PLACENTA is perhaps the most important ;—the medium of communication between the mother and her infant ;—the organ through whose means life is sustained, nourishment supplied, and growth perfected.

The term placenta was derived from its shape.* It consists of a flat, spongy, irregularly circular mass, composed entirely of fœtal vessels,—the ramifications of the umbilical arteries and vein, which are connected together by loose cellular substance. It is usually from seven to nine inches in diameter, and about one inch in thickness at the thickest part, where the umbilical vessels enter its substance, gradually becoming thinner

* *Placenta* in the Latin language signifies a cake ; from *πλακους*, the same.

towards its edge. It generally weighs about a pound or a little more; but in this respect it varies considerably, its bulk being principally influenced by the size of the child; sometimes, however, its increased weight is dependent on an excess of its own growth alone, probably the effect of diseased action. It has been supposed to possess absorbents. Hunter* suggested the probability of these vessels being present; Schræger, Wrisberg, and Chaussier, contend for them; and Fohman imagined he had found them in rich profusion. Sir E. Home and Mr. Bauer believed they had detected nerves by the aid of a strong magnifying power; and this is also the opinion of Chaussier. I have never been able to see either nerves or absorbents in this organ, or in the funis; and most physiologists deny their existence. If it possessed absorbents, it is to be presumed that they would be sufficiently evident to the eye in every instance; and a strong argument against there being nerves is the fact, that no pain is felt by the child when the funis is divided.

It has two faces:—the one foetal, (plate 25, fig. 1,) next the embryo; the other maternal, (fig. 2,) in apposition to the uterus. It is covered on the foetal face by the reflexed decidua, by the chorion and the amnion; and on the maternal by the decidua vera. The foetal surface has therefore a smooth, glistening appearance, which it obtains from the two ovular membranes; these are raised into numerous dark coloured ridges, radiating in a serpentine manner from near the centre, and becoming less evident as they approach the edge; produced by the divisions of the umbilical vessels, before they dip into, and bury themselves in, the substance of the mass. As these tortuous eminences are vessels, and the largest of them veins, the deepness of their colour depends on the contained blood shining through their coats, and the trans-

* M. S. Lectures; vide Granville on abortion, p. 19.

parent membranes covering them. The maternal surface presents a very different appearance. Invested with the opaque, flocculent, fibrous decidua, it puts on a fleshy look, and is divided by sulci into a number of irregularly shaped lobes. Each of these lobes is formed by the ramifications of one branch of the umbilical arteries and vein on their first splitting; and the vessels of one lobe, subdividing in an arborescent form, anastomose but sparingly with each other, and not at all with those of its neighbour. The deciduous membrane is carried continuously over from one lobe to the others, like the arachnoid over the convolutions of the brain, and does not penetrate between them into the placental structure. By some anatomists nevertheless it is supposed to dip deep among the placental vessels, even to the foetal face of the organ.

Use.—It is now established as an incontrovertible fact, that the salubrious change which the foetal blood undergoes, is accomplished in the placental mass; but the immediate mode has given rise to much difference of opinion. It has been explained in four ways. Some physiologists contend that there is a direct communication between the mother and the foetus by means of *continuous vessels*. Others, that the mother's blood passes by *absorption* into the foetal system. Others, again, that the mother's blood is poured into certain *sinuosities* or *cells*, existing on the maternal surface of the placenta, which are destined by nature to receive it; and that while extravasated in these cells, the foetal vessels deprive it of whatever is necessary for the preservation of the embryo. This was the theory established by Hunter, which became so widely disseminated and followed. This physiologist, therefore, considered the placenta divisible into two distinct portions,—a foetal and maternal; and he described also two separate circulations going on in it simultaneously,—the one of the mother, the other of the child:—while another party entirely denies the existence of the placental cells; and

supposes that the same benefits result to the foetus—its vessels ramifying in close approximation to those of the mother—although the mother's blood *never enters the placenta* at all, nor ever indeed leaves her system.

I am myself an advocate for the last view. Since the question, however, is yet in dispute, and since its discussion would occupy much space, it would be out of place to enter upon the different arguments in a work principally directed to practical objects. But rendering the blood fitted for the continuance of life is not the sole office of the placenta; it is the means also of conveying nourishment to the foetus; so that this viscus performs at the same time the functions of two of the most important organs of breathing life,—the lungs and stomach.

Attachment.—The placenta may be attached to any part of the internal surface of the uterus, and it necessarily occupies a space equal to its own diameter. It is perhaps most usually apposed against the posterior surface of the body; but occasionally it is found at the very fundus, more rarely towards the neck, and more seldom still over the mouth itself; in which latter case its position must necessarily give rise to much loss of blood when the orifice opens in labour.

Its attachment is by *simple apposition*, one layer of the decidua being interposed between the two surfaces. There is no *adhesion* in the natural condition of the parts; and whenever agglutination does take place, it is the consequence of diseased action.

Disease.—The placenta is liable to organic change of structure. Thus it is sometimes found so soft, as scarcely to bear the gentlest handling without being broken. At other times it is much firmer than common, although no other morbid alteration can be observed in it. At others, granules or spiculæ of bone are strewn over more or less of the maternal face, or pervade more or less the whole

substance ; so that when the finger is run over it, it feels as though it had been dusted with coarse sand. In other instances, again, solid tumours, bearing much the appearance of scirrhus glands, are found embedded in the mass ; and occasionally, but very rarely, it is hydatidinous.

Twin placentaë.—In plural gestation a separate placenta, a separate funis, a distinct set of foetal membranes, and a distinct quantity of liquor amnii, are formed for each child. The placentaë are commonly joined together at their edge, and when regarded on the maternal face, they have the appearance of a single organ. But the vessels of the one do not anastomose with those of the other ;—the circulations are perfectly independent ; so that the blood of one child does not pass into the system of its brother. One of the twins may, therefore, still live after the other has died ;—one may be healthy while the other is the subject of disease. (Plate 29, fig. 1.)

It occasionally happens, indeed, that a communication exists between the vascular systems of the two children, though they are both enveloped in separate membranes ; and it has been also, though very seldom, remarked, that both were wrapped up in the same bag of membranes ; and that the funis having arisen by one branch from the single placenta, has split into two divisions to supply each foetus.

Battledore placenta.—The navel string usually enters the placenta near the middle ; but it sometimes passes into it at the edge ; and not unfrequently the vessels divide into a number of branches before they arrive at the substance of the mass. To this formation the name of battledore placenta is given ; (plate 26, fig. 1 ;) and it is of importance in practice, that this deviation from the natural condition should be borne in mind ; because if attempts were made to remove a placenta of this description by traction at the funis, as soon as the insertion of the vessels into its sub-

stance could be felt by the finger,—while the great part of its bulk was still in utero,—much danger might be induced ; as will be shown in an after part of this publication.

THE FUNIS UMBILICALIS, UMBILICAL CORD, OR NAVEL STRING, is a rope-like cord running from the navel of the child into the body of the placenta—a framework for the transmission of blood-vessels. It varies much in length ; in some instances not exceeding six or seven inches ; in others being more than five feet. Its average length may be regarded as from eighteen to twenty-four inches. It varies also in thickness, and this depends on the larger or smaller quantity of a viscid semi-transparent gelatinous matter,—the gelatine of Wharton—contained in cells, which constitutes the principal part of the thickness of the cord. These cells do not communicate with each other freely. Both the cells and the contained gelatine are evidently for the purpose of protecting the blood-vessels from pressure. Plate 26, fig. 2, shows a portion of the funis cut longitudinally ; the dark spaces are the cavities of the arteries and veins unoccupied ; the lighter parts show the reticular cells filled with mercury. The preparation from which this drawing was taken, proves how slight the connexion between the cells must be ; else, as the funis is suspended from one extremity in the spirit which preserves it, the mercury would run out by its own weight.

The funis gives a passage to three blood-vessels—two umbilical arteries and one umbilical vein. The arteries are longer than the vein, being considerably more tortuous ; and they generally continue their course in a spiral direction, running round the vein ; in the majority of cases being twisted from the left to the right. (Plates 25, 26, and 29, fig. 1.) They sometimes form simple turns upon themselves, as seen in plate 30, fig. 2, *aa* ; at others they are twisted into fantastic convolutions, giving

the external surface of the cord a knotty appearance, not unlike varices in the legs. (Plate 26, fig. 1, *a*.) They will then run for some length straighter and nearly parallel to the vein. Sometimes the funis itself is found in labour to be twisted into a loose knot; but this appears to me to be produced rather by the movements of the foetus in utero, than to exist as an original conformation. The vein is much greater in its calibre than the two arteries together; but as the latter vessels are perhaps twice the length of the vein or more, the quantity of blood actually contained in the two arteries at one time may be nearly the same as in the vein.

The vein possesses no valves; and the arteries do not communicate with each other until they reach the placenta; when one generally sends off a large transverse branch to the other. The arteries carry adulterated blood from the body of the foetus to the placenta, and have a very strong pulsation; the vein carries back again to the foetus, pure blood imbued with the principles of both vitality and nourishment. In some respects, then, these canals may be likened to the pulmonary vessels; but the umbilical vein, by transmitting the means of growth, as well as of the continuance of vitality, performs an office superior in value to the pulmonary veins, which give passage to fluid fraught with the principles of life alone. Whether much difference of colour exists in the blood transmitted by the vein and that circulating in the arteries, is a point not very easy to determine. Granville and Mayo assert that the colour of the blood in the umbilical vein is somewhat lighter than that in the arteries. Meckel and Blundell, again, think there is no manifest difference, and that both contain an equal quantity of carbon. But while we know that breathing life cannot be sustained without some alteration being effected on the blood through the influence of the atmosphere, and that even aquatic animals are

furnished with organs for the express purpose of purifying their blood, it is not too much to assume that a similar change is required for preserving the vitality of the foetus; and that this function is carried on by the placenta.

Although there is much variation in the *straightness*, or *tortuosity*, we very rarely meet with any variety in the *number* of the umbilical vessels. In two specimens preserved in the London Hospital Museum, there is only one umbilical artery; and Dr. Hunter mentions that he had seen many instances of such deviation, but none in which there were two veins. Velpeau, however, states that two veins have been met with, and refers to Guillemot for authority. As far as regards the arteries, I do not know of any case on record, in which either of the internal iliacs sent off two umbilical branches, so as to form three arteries in the cord. Both the blood-vessels and cells are covered by the amnion and chorion;—the amnion being here, as on the foetal face of the placenta, external.

The rapidity of the circulation through the cord has been a subject of frequent discussion; and the probability is, that it differs much in different individuals, and in the same individual foetus at different times. The number of pulsations generally ranges at one hundred and twenty or one hundred and thirty in the minute; but it seems that the foetal circulation is greatly influenced not only by causes existing within its own system, but by accidental circumstances affecting the mother, and external agencies to which her person may be exposed. Both the mental passions and the loss of blood from the mother's body, with many other causes, have a decided effect on the foetal pulse.

The funis is often found coiled round the neck or limbs of the foetus; and this may embarrass us in practice.

When the embryo is first visible, in the earlier weeks

of utero-gestation, we see nothing like a funis umbilicalis ; but the newly-formed being is attached by its abdomen directly to the amnion. It appears first about the end of the fifth week : for some time it contains a much larger proportion of gelatine than during the latter months ; and the vessels, which before were perfectly straight, (plate 22, fig. 3 *e*.) assume a twisted character about the end of the tenth week.

Disease.—The umbilical cord is liable to disease ; the most frequent derangement in its structure, perhaps, is the secretion of too large a quantity of gelatine in its cells. This, if considerable, may obstruct the flow of blood through the vascular ducts, and occasion the death of the foetus. Thus, a diseased condition of the funis may indirectly lead to abortion. Plate 23, fig. 4, shows an ovum, in which the funis is much greater in circumference than it should be, owing to there having been too much gelatine formed. It destroyed the life of the embryo ; but the ovum was retained in utero for some time after the cessation of its vitality, as is proved by the thickness and solidity which the involucra have acquired.

URACHUS.—In the quadruped, besides the blood-vessels, there is another pervious duct running along the funis called the URACHUS. This rises at the fundus of the bladder, passes out of the foetal body at the navel, and accompanying the blood-vessels as far as the ovular membranes, continues its course till it terminates in a bag between the amnion and chorion, called the ALLANTOIS ; thus the cavity of the bladder communicates with the allantois by means of the urachus. In the human subject there is no duct ; but an impervious cord runs up from the fundus of the bladder, and is lost at the umbilicus. This is also called the urachus ; but it is not generally continued along the funis, and there is no cavity between the ovular membranes resembling the allantois.

The *VESICULA UMBILICALIS*, or *VESICULA ALBA*, constitutes also a part of the ovum in its early stage. It is a small sac, not larger at its greatest magnitude than a pea or swan-shot, situated between the amnion and chorion, possessing a pellucid coat, and enclosing a small quantity of viscid transparent fluid, whitish, or more generally rather of an amber colour. The largest on record is mentioned by Lobstein: this measured six lines in diameter. Its appearance is confined to a particular stage of pregnancy, being first noticed during the early part of the second month, according to most observers; but Velpeau speaks of it being the size of a pea on the fifteenth or twentieth day from impregnation, and says that it has acquired its greatest magnitude during the third or fourth week. It is generally believed, however, to enlarge till about the middle of the third month, when its contained fluid becomes thicker and opaque; the vesicle itself then begins to dwindle in size, and speedily disappears altogether. Hunter, Meckel and others, have observed it at the end of gestation. When, however, it persists longer than usual, it does not continue to increase, but at the close of pregnancy is as small as it was at the end of three months.

From one extremity of the vesicle a duct is sent out to join the funis umbilicalis, becoming thinner as it recedes from the bag, until to the naked eye it is lost upon the cord itself. It may be traced, nevertheless, by magnifying glasses running along the funis, entering the body of the embryo, and eventually communicating with the cavity of the cœcum or with the ilium, just where it joins the last-named intestine. The distance between the vesicle and that end of the funis farthest from the body of the embryo varies, being sometimes not more than half an inch, at others twice or three times as much.

It is supplied with blood by a distinct artery and vein,

called the *omphalo-mesenteric* vessels; the artery proceeds from the inferior mesenteric passes between the convolutions of the intestines to the umbilicus, and thence along the funis; the vein arises from the walls of the vesicle, traverses the funis in company with the artery, and finally terminates in the superior mesenteric vein, before that vessel enters the porta. The omphalo-mesenteric vessels shrivel as the vesicle itself disappears. They have been observed, indeed, both by Chaussier and Beclard, in the funis of a full-grown foetus, dwindled into white impervious cords.

Its use is still involved in some degree of mystery. The best explanation is offered by Velpeau; he supposes the fluid it contains to be nutritious, and intended to contribute to the development of the embryo, until the cord and umbilical vessels are elaborated. It is, according to him, analogous to the vitelline sac of the chick; which it resembles in shape, position, and connexion with the intestines, structure, and the character of the contained fluid. We must acknowledge, however, that there is a material difference between the two; because, in the chick, the ductus vitello-intestinalis is constantly becoming shorter, until the whole bag is received into the abdominal cavity; while in the human ovum the vesicula umbilicalis is in close approximation to the abdomen of the embryo until the formation of the funis; after which its duct elongates as gestation advances; and it consequently recedes from, instead of approaching nearer to, the foetal body.

In Plate 29 are represented two specimens of the umbilical vesicle. Fig. 2 shows the vesicle *c* floating loosely, detached both from the amnion *b* and chorion *a*; it is suspended by the duct containing the omphalo-mesenteric vessels: the embryo is seen enclosed in the amnion. This ovum I should consider to be between five and six weeks

old, but I am not acquainted with its history. Fig. 3 gives the vesicle *a* in its natural position between the ovular membranes, its fluid having already become opake. This ovum is at least seven weeks old.

THE FŒTUS.

The different constituents of the ovum, which have been already described, are formed solely for the protection, preservation, and growth of the FŒTUS:—to its necessities all the other parts are contributory and subservient. At the end of gestation the fœtus ordinarily measures about twenty inches from the crown of the head to the heel, and weighs nearly seven pounds: but there is an amazing difference in both these respects, particularly the latter; and the size is influenced by circumstances not very easily explained. Generally speaking, males weigh more than females by one or two ounces, and are longer by a third or half an inch. Some children at full time have been known to weigh even less than five pounds; while many cases are on record where the weight exceeded double the average. Thus Baudelocque mentions that he has seen one child at birth which weighed twelve pounds, and another thirteen.* The late Dr. Merriman delivered a woman of a fœtus that weighed more than fourteen pounds.† Sir Richard Croft saw one born alive of fifteen pounds.‡ Spence gives a case in which the child and placenta together weighed sixteen pounds Dutch weight, after the brain had been evacuated.§ My father once delivered a woman of a fœtus that weighed sixteen pounds

* L'Art. des Accouchemens, parag. 432.

† Communicated to me by Dr. Samuel Merriman.

‡ Communicated by the same gentleman. See also Hutchinson on Infanticide, p. 15.

§ System of Midwifery, case xxv.

and a half avoirdupois.* Dr. Moore, of New York, states that in 1821 a child was born in that city that also weighed sixteen pounds and a half.† And Mr. J. D. Owens assisted at the birth of a child, which weighed seventeen pounds twelve ounces; and whose length was twenty-four inches.‡ This, as far as I know, is the heaviest well-authenticated fœtus on record. Of the three largest children I was ever myself at the birth of, one weighed fourteen pounds; this was a breech presentation, and the child was born dead: another was twelve pounds and one ounce; this I extracted by the forceps; it was also dead: the last weighed twelve pounds and three quarters; this was expelled naturally; it gasped two or three times, but could not be restored.

The usual position in which the fœtus lies in utero is the most easy, as well as compact, that could possibly be devised for a body of such bulk and irregularity. Its general figure is that of an oval, the long diameter being placed nearly perpendicularly as regards the trunk of the mother. The head is situated towards the os uteri, the vertex being the most dependent part; the chin is pressed upon the chest; the neck and back are bent into a curve; the nates lie at the fundus uteri; the thighs are flexed up towards the belly, and the legs somewhat turned back upon the thighs; the arms are crossed upon the chest; or one hand is placed by the side of the head, and the other on the chest or by the breech; sometimes both lie by the side of the head; or they may be otherwise variously disposed. Thus one end of the oval is formed by the vertex, and the other by the breech; and its adaptation to the cavity, in which it is placed, is most perfect.

In Plate 32, the fœtus at maturity is seen folded as it commonly lies in utero.

* Practical Observations in Midwifery, case liii.

† New York Med. and Phys. Journal, vol. ii. p. 20.

‡ Lancet, vol. i. 1838-39. p. 477.

The quantity of matter that is contained within the gravid uterus at the end of gestation, provided we allow seven pounds for the fœtus, one pound and two or three ounces for the placenta and membranes, and above a pound for the liquor amnii,—will be between nine and ten pounds in all. But this will differ not only according to the size of the fœtus and placenta, but also according as the water has been more or less largely secreted.

DEVELOPMENT OF THE UTERUS.

THE uterus is constantly enlarging during the whole term of gestation, and its increase corresponds with that of the ovum; so that its growth towards the close of pregnancy is comparatively greater from week to week than at any other period. The fundus and body are first evolved; and the neck does not begin to expand until five full months have passed. Before this time the principal part of the organ is globular in shape, and the elongated cervix projects from it below, as is seen in plate 30, fig. 1, which is copied from Hunter's work, and represents the back face of the gravid uterus and vagina at the commencement of the fifth month. But in the sixth month the fibres of the uterine neck begin to develop themselves; they become, as it were, unfolded—the process commencing from above, and by degrees progressing downwards,—and at the end of gestation the cervix is so completely opened out, that it forms part of the general cavity. Plate 28 shows the gradual change taking place in the neck of the womb. Fig. 1 represents it at the end of the third month; fig. 2 at the end of six months; and fig. 3 just before labour begins. The enlarged glandulæ Nabothi are also well delineated; and the fissured charac-

ter that the os uteri sometimes assumes towards the termination of pregnancy is seen in figure 3.

The parietes do not become thinner as the uterus grows, but in many instances absolutely thicker. They are not distended by their contents as a bladder might be blown up; and the cavity is never so completely filled, but that it would hold somewhat more than it contains. The enlargement is dependent on a process of healthy evolution; and if any pressure or distension from within occurs, as is the case when a preternaturally large quantity of liquor amnii is formed, much inconvenience and pain result.

Great as is the increase of the womb in its general bulk, the blood-vessels undergo an enlargement even far more considerable in proportion; and this is explained by the fact that they have not only to nourish the parietes, but also to supply the wants of the growing fœtus. It is this circumstance which renders the texture of the gravid womb so loose and ductile; and the amazing diameter they have acquired before labour commences, most readily accounts for the violent hemorrhages that not unfrequently attend on parturition.

This alteration in the size of the blood-vessels mainly contributes to the increase of the uterine parietes; there is nevertheless an additional quantity of both cellular and fibrous matter secreted, as the evolution proceeds. The nerves and absorbents also partake of the general enlargement; though not to so great a degree as the blood-vessels.

For the first few weeks of gestation the uterus descends somewhat lower towards the outlet of the pelvis than the position it previously held; and this subsidence often occasions troublesome and annoying symptoms, such as pressure on the absorbents and veins, producing œdema and varices; and on the nerves, causing cramp. Nor do the bladder and rectum escape; and a frequent inclina-

tion to evacuate the intestine, but more particularly constant calls to pass urine, are among the many distresses consequent on early pregnancy.

About the end of the fourth month it begins to mount from the pelvis into the abdomen; and its fundus may then be felt emerging above the symphysis pubis. The time of its residence within the pelvis, however, will much depend on the size of that organ. The smaller the capacity, the sooner will it rise; and if the dimensions be preternaturally large, it will remain a tenant of the cavity for a proportionably longer period. In its ascent it passes before the intestines, carrying the omentum up above it; and when it has nearly acquired its extreme bulk, the colon lies along its fundus; and it encroaches in some degree on the space occupied by the stomach. (Plate 31.)

It is not to be supposed that these changes can go on in the uterus without the viscera in connexion with it being also materially affected in regard to their relative situations. Thus the neck of the bladder is somewhat drawn up with the neck of the ascending uterus. But the principal alteration is observed in the peritoneum, the Fallopian tubes, the broad ligaments, and the ovaries. The peritoneal covering is of necessity greatly extended in surface; and this depends partly on the formation of new membrane, a fresh secretion,—partly on its allowing itself to be stretched out in every direction, (for it is highly elastic, as is shown in the variations of contraction and distension which the stomach, intestines, and bladder, are constantly undergoing, and in the descent of that portion of the membrane which constitutes the sac in hernia;)—and partly on the layers of the broad ligaments splitting, and receiving the sides of the uterus between their folds. This latter cause occasions the ovaries to be drawn nearer to the substance of the organ than they are in their natural condition; while, from the same cause, both the broad and round ligaments run

almost perpendicularly downwards to the pelvic brim, instead of horizontally as in the unimpregnated state. The Fallopian tubes also, from the disposition of the ligaments, lie for some distance upon, and in close approximation to, the body of the uterus. At the termination of pregnancy, the womb measures about thirteen inches in length and eight or nine in breadth; and it has acquired an ovoid figure. (Plate 31.)

ON LABOUR.

When gestation is completed, the uterus, which during the period of its growth was inert, allowing itself to be evolved and acquiring a surprising size, begins a new action, which constitutes the function of LABOUR, or PARTURITION. These simple terms designate a very complicated process, embracing the dilatation of the passages, as well as the expulsion of the ovum.

The principal agent in labour is the uterus itself; but it is much assisted in its action by the contraction of the abdominal muscles, and probably also of the diaphragm.

Under labour the fœtus is perfectly passive: so that a dead child is expelled, generally speaking, nearly with the same ease as a living one. The ancients, indeed, thought that the infant, by its own struggles, contributed a great share in procuring its freedom; and Ætius—who lived towards the end of the fifth century, and whose works principally consist of a compilation from those of previous authors—especially mentions the death of the fœtus as one cause of difficult labour; since it could give no assistance, by reason of its being still.* We may presume this was a prevailing doctrine before the time of this writer, and it continued so for many centuries after.†

* Discourse 16, chap xxi, of Cornarius' translation.

† Vide Muariceau, livre ii. chap. 10.

The action of the uterus is perfectly involuntary, and consists in a contraction of the fibres embedded in its structure, which indeed form its peculiar parenchyma. These fibres obey in labour the laws of muscular action; their extremities are brought nearer together, and in the same proportion as their length is diminished, they become increased in thickness. Thus, inasmuch as the fibres run throughout the uterus, traversing it in all directions, every part of the uterine structure is lessened in extent, the capacity of the uterine cavity is decreased, and the internal membrane is brought into forcible contact with the contents. By this contraction pressure is exerted, propulsion is produced, and eventually expulsion is effected. Even after the child is born the same kind of contraction goes on in the uterine parietes, for the purpose of expelling the placenta, and of gradually closing the open vessels. It is by this contraction that hemorrhage is prevented, and the safety of the patient in that respect ensured.

But the auxiliary muscles which assist the uterus in its contractions are in a great degree voluntary; so that labour may be said to consist of a mixed action; partly of a voluntary, but principally of an involuntary character: for the aid which the woman contributes by the exertion of her own will is not to be compared to the propelling power of the uterus, which is entirely independent of her control.

The general features of labour are the same in all cases, but there is an infinite diversity in the details. Sometimes it is complicated with irregularities and dangers; it is always attended with more or less of suffering, if the patient be conscious. The duration of the process and the pain suffered vary much in different women, and in the same woman in different pregnancies. The pain endured is sometimes regulated by the strength of the uterine contractions;

sometimes by the resistance offered to the child in its passage ; but frequently it depends on the degree of irritability or sensibility possessed by the uterus itself. There is no doubt that this organ in some women is much more sensitive than in others ; and we may fairly presume that in the same woman it is much more sensitive at one labour than at any previous or subsequent.

THE SYMPTOMS OF LABOUR may be classed under two heads :—those which are indicative of the approaching crisis,—and those which intimate that the process has actually commenced.

The symptoms indicative of approaching labour are, first a subsidence of the uterine tumor ;—secondly, an increased moisture and laxity of the vagina and external organs ;—thirdly, a peculiar degree of mental anxiety.

1st. When about eight months and a half of utero-gestation have passed, the uterus has acquired, not perhaps its largest size, but its greatest height in the person ; its fundus has then pretty nearly reached to the ensiform cartilage. But at the end of nine months it has generally sunk back to the situation which it occupied at the end of eight ; so that its fundus may be felt half way between the ensiform cartilage and the umbilicus. This diminution in volume occurs indeed sometimes suddenly,—during the course of one night for instance,—and the woman on rising from her bed is surprised to find herself so much less than she was the day preceding. But more frequently it is gradual, almost imperceptible from day to day, but sufficiently obvious after the lapse of several. It is partly produced by painless contraction going on in the uterine fibres themselves, and partly by the subsidence of the organ within the pelvic cavity. It is to be regarded as a good symptom ; for it shows us that labour is disposed to commence in a natural manner ; and also—especially is this knowledge valuable in a first pregnancy

—that the woman has a tolerably roomy pelvis ; for if any portion of the head will enter the brim, while covered by the cervix uteri, it is reasonable to expect that it will readily descend into the cavity when the os uteri is dilated. It is a remark constantly made by women when within a day or two of their confinement, that they are both smaller in size and feel lighter and more active in their persons than they had done for some weeks before. This is, however, by no means an universal occurrence, and it is not to be looked for in cases where there exists a contraction of the pelvic entrance.

2nd. The second indication of approaching labour is increased moisture, relaxation, and distensibility of the vagina and external parts, together with some slight tumefaction of the vulva, the consequence of a larger supply of blood being determined to these organs. This is very apparent not only in the human female, but also in the brute creation. It is very usual ; and this too is a good symptom, because it shows that there is a disposition in the passages to become relaxed and open, as well as in the uterus to contract. It is dependent on one of nature's unerring laws. Some physiologists would teach us to believe that dilatation in labour is *entirely a mechanical act*—that as the uterus contracts it propels the head first through the os uteri, by dilating it mechanically, then through the vagina, and lastly through the external parts, solely by the same forcible distension. It is evident from the structure of the organs that a mechanical dilatation to such a great extent never could take place, unless a corresponding disposition to relax were given them at the same time ; and therefore we must consider the dilatation of the passages *not entirely dependent on mechanical distension* ; but that it is in a great measure to be referred to that institute of nature, which induces them to be-

come relaxed and softened, when the uterus is about to commence contraction.

3rd. The third indication of approaching labour is drawn from the state of the mind. We often observe that many days before any painful sensation is experienced, there is a degree of *fidgetiness* or anxiety for the result of the case. This is more strikingly marked in the lower animal than in the human subject. A woman has reason to sustain and guide her; she is confidently impressed with reliance upon a Supreme Power; she has the opportunity of calling to her aid the soothing comforts of religion; but the brute possesses none of these advantages. In our common domestic animals—the bitch, the cat, and others, whom we can watch narrowly prior to the commencement of parturition—we observe that a day or two before the process actually begins, they appear in great distress: their cries are evidently not those of pain, but—if we may allow it them—of anxiety; and they busy themselves in preparing a bed to which they may retire, when *their time* comes. The same mental distress may be remarked in the female of our own race, modified and controlled by reason, fortitude and religion.

The symptoms which indicate that labour has actually commenced are, first, irritability of the rectum and the bladder; secondly, nausea and vomiting; thirdly, rigors or tremors unattended with any feeling of cold; fourthly, a sanguineous discharge flowing out of the vagina; and fifthly, painful sensations. These are enumerated in the inverse order, in regard to their importance as diagnostic signs.

1st. The frequent inclination to pass urine and fæces, dependent on irritability of the bladder and rectum, arises from the contiguity existing between these organs and the os uteri, their deriving a portion of their nervous supply from the same source, and the consequent sym-

pathy, through which they mutually affect each other. They are very usual symptoms of commencing labour; and are to be attributed to the process of dilatation going on in the os uteri. A desire to evacuate the bladder will perhaps occur every ten or fifteen minutes, although there be scarcely any fluid in it. Medicines are of little avail in this species of strangury; but the feeling mostly disappears as soon as the mouth of the womb is tolerably well dilated; so that before the head comes to occupy the pelvis, it has generally ceased. The same remark may be made with regard to the tenesmus. This symptom is more distressing than the irritation at the neck of the bladder, and it may sometimes be relieved by a simple demulcent injection: if the patient be suffering much annoyance from it, and the labour is progressing but slowly, a few drops of laudanum may be added to the enema with advantage.

2nd. Nausea and vomiting very frequently—indeed almost always—attend on the dilatation of the os uteri; and we have opportunities constantly afforded us of remarking that these two actions bear to each other the relation of cause and effect. It is by no means unusual to find, when the os uteri is rigid during the first stage of labour—when it evinces little disposition to dilate or relax—when this state has continued for hours, and when very little progress has been made in the interval, even although the pains may have been both frequent and strong;—that on a sudden attack of vomiting supervening, not referable to any external cause, a favourable change is speedily produced in the uterine mouth;—it has become softened, relaxed, and is dilated; and the process goes on from that time with comparative rapidity. Hence vomiting at the early part of labour has been looked upon as a good symptom. And it has even been recommended, in cases rendered lingering by rigidity of this organ, to

give emetics for the purpose of exciting sickness, under the impression that the act of vomiting was the *cause* of the relaxation taking place. It is not the cause but the *effect* of that relaxation; so that the artificial production of vomiting is not followed by the good anticipated: emetic are, now, indeed seldom had recourse to with the view of forwarding the dilating process; although nauseating doses of antimony are sometimes employed with beneficial results.

The matter ejected under this attack of vomiting is merely what the patient has lately taken into the stomach, mixed with the healthy secretions of that viscus, and perhaps with a little bile. The effort itself is not attended with much straining; it is more inconvenient than painful. It seldom lasts any length of time:—there are a few paroxysms, and then the affection ceases. Sometimes, however, it will continue to distress and harass the patient for many hours. In such cases it may perhaps be dependent on a deranged state of the stomach itself, or some other cause, besides the sympathy existing between that viscus and the os uteri. The exhibition of an effervescent draught, with five or six minims of laudanum, will then be found the most serviceable as well as grateful medicine. But in ordinary cases no remedies will be required.

Vomiting at the *commencement* of labour, then, may be regarded in a favourable light rather than otherwise, as indicative of the softening process going on in the os uteri. But it behoves us to discriminate most carefully this kind of vomiting from that which takes place under protracted labour,—long after the first stage has terminated, and when the system is worn out and exhausted,—which indeed is one of the very worst signs we can observe. There is not much probability that a mistake should be made in this particular;—the one appears

early in the labour; the other most likely after the patient has been in pain a great many hours;—accompanying this there are no symptoms of exhaustion; the woman is in good spirits, the pulse is not much accelerated, and the countenance is not dejected;—with the other there appear progressive symptoms of urgent distress, which will hereafter be specially enumerated. The matter ejected from the stomach would also be a guide, if any doubt existed. In the first kind it consists of what the patient has last taken mixed with the natural secretions; when it is the effect of exhaustion it is a deranged secretion—and this is sometimes formed in astonishingly large quantities;—and in the worst cases it is foetid, dark in colour, of a greenish cast, or, like the matter vomited in the last stage of typhus fever, possessing somewhat the appearance of coffee grounds.

3rd. Another symptom frequently accompanying the commencement of labour is the occurrence of shivering, or tremors unattended with any sensation of cold. This also is dependent on the opening of the os uteri. Such rigors are seldom distressing; the patient pays but slight regard to them;—she perhaps feels a little chilly or shivers in a trifling degree, and she may experience many cold fits; but when the os uteri is dilated they disappear. They are neither connected with any irregular arterial action, nor with pain in the head or other bad symptom. Sometimes, indeed, they are sufficiently intense to shake the bed on which she lies, and cause her teeth to chatter as if she were in the cold stage of an ague fit; and although she complains of being very much chilled, the surface may be warmer than natural. It is scarcely necessary to use any other means than to add an extra covering to her person, and exhibit any warm diluent that she fancies.

This simple shivering must be distinguished from that

state in which the frame is violently agitated, and which is a species of convulsions of the most dangerous character, that will come under consideration in a subsequent part of this work.

4th. The next symptom to be noticed, is a discharge from the vagina of a glairy character, tinged with blood, technically termed, in the language of the lying-in room, *a shew*. It consists of an increased secretion from the vaginal surface, mixed with the gelatinous mucus which had previously blocked up the uterine neck, and which is allowed to escape when the os uteri opens; and of blood poured out from those small vessels of the os and cervix uteri, which ran into the deciduous membrane, and which are rendered patulous by the separation of that membrane, as soon as the dilatation of the womb commences.

This is a stronger symptom of labour having commenced than any I have yet mentioned. When, indeed, this “shew” takes place at the full period of pregnancy, or near it,—especially if it be attended with periodical pains,—we may be almost certain, even before we make an examination, that the process has actually begun. A considerable loss of blood towards the close of pregnancy will be sometimes called by the same name. Such hæmorrhages, however, are by no means to be regarded as indications of parturition, unless there be observed mixed in the discharge the glairy gelatine that had before occupied the cervix uteri.

5th. But of all the symptoms announcing the access of labour, pain is the most prominent. This is produced by the contraction of the uterine fibres, and is referred from the uterine region to the loins, to the upper part of the sacrum and the inner side of the thighs. Labour-pain is merely the external evidence of uterine action; and the two phrases are used synonymously as well by all writers, as teachers of obstetric medicine. The sen-

sation of pain is occasioned partly by the sensitiveness of the uterus itself, partly by the resistance offered to the parietes of the organ by the uterine contents, during contraction, and partly by the pressure of some part of the ovum against the os uteri and vagina under the process of dilatation. So that it has three sources—one dependent on the simple action which, like the spasmodic contraction of muscles, is attended with suffering—another, that of opposed propulsion—and the third, that of distension of the passages. As a general principle, it may be said that the stronger the uterus acts the greater is the pain. In some women painful sensations accompany the very first commencement of dilatation, before the os uteri has attained a diameter sufficient to admit the point of the finger: in other instances, the organ will have been opened to a considerable extent before any pain is experienced; so that labour has made great progress unobserved and unnoticed. These are the cases in which it is supposed that the whole process has been completed by the effect of three or four pains. We cannot imagine that such complicated actions could be perfected by so slight an effort; and we have proof to the contrary daily presented to our observation. The explanation is easy, on the ground that dilatation has been accomplished without any sensation of pain; and that the *expulsive efforts alone* have been attended with suffering.

Uterine action, and therefore labour-pains, may be suspended or removed by many causes: opiate medicines taken into the stomach, injected into the rectum, or rubbed upon the surface of various parts of the body, will usually abate the contractions in a greater or less degree. Passions and emotions of the mind, as fright or sudden surprise, but especially those of a depressing character, such as deep grief, or more transient sorrow, will also produce the same effect. Even so trifling a circumstance as a

stranger entering the room when the patient expected her own attendant, has been known to put a stop to labour, in the midst of its most active operations, and to suspend it for many hours. It is principally on this account that we are careful to prevent a woman in labour becoming suddenly acquainted with any news that is likely to shock her.

Labour-pains are not constant, but periodical; they intermit with intervals of ease, as the contractions alternate with relaxations. When the uterus is inactive, there is neither any pressure against its contents, nor any forcing of them through the os uteri, and the painful sensations for the time cease.

At the commencement there is merely a feeling of uneasiness; and when active pains first begin, they are short, weak, and occur at long intervals; by degrees they become more frequent, longer, and stronger; till towards the end of the birth there is one continued effort at expulsion, lasting, perhaps, for three or four minutes uninterruptedly.

The contractions of the uterus are attended with different sensations, as also with a different expression of suffering at the different periods of labour. Those pains which depend on the dilatation of the os uteri are described by the woman as being of a *grinding* or *cutting* character. They are accompanied by a moaning noise: if the patient be walking about the room, she will rest on her attendant's arm, bend herself a little forward for a few seconds, utter a subdued, grumbling noise, and then resume her exercise; or, if she be sitting in a chair, she will shrink, as it were, into a smaller compass, press the elbows of the chair with some degree of force, give utterance to the same kind of moaning sound; and gradually stretch herself out again. When, however, dilatation has gone on to such an extent as that some portion of the contents of the uterus is propelled through the

mouth low down into the vagina, the pains become of a *forcing* nature; and the expression attending them is very different from that just described. Under these expulsive pains the breath is held in, and the patient forces down and strains as though she were passing hardened fœces. She gives no audible evidence that she is in pain, or perhaps she will make the smothered noise which is usually attendant on a great effort; until towards the close of the paroxysm, when an expression of more acute suffering escapes her. And when the head is resting on the perineum, distending the external structures, and just about to pass out, she cannot restrain herself from giving vent to a loud shriek, or kind of wild cry.

SPURIOUS PAINS.—But the presence of pain, even if it be periodical, is not always symptomatic of labour having begun; for towards the end of gestation, women are subject to pains in the loins and bowels, simulating true labour-pains in some respects, but not connected in any way with uterine action: hence they are called *spurious*, or *false pains*. Sometimes they are confined in their situation, at others they are erratic; sometimes they return at tolerably certain intervals; more frequently they are very irregular in their recurrence. They are often connected with dyspeptic symptoms, and sometimes attended with involuntary spasms of the diaphragm and abdominal muscles, which cause the woman to bear down and believe herself in labour. Occasionally, also, a copious watery secretion from the glands of the os uteri occurs, so as to give an idea that the membranes of the ovum have broken; at other times an involuntary gush of urine takes place under the pains, which has often been mistaken for the liquor amnii. If it be urine that passes, it may easily be distinguished by the odour; if a secretion from the glandulæ Nabothi, it will be ob-

served to dribble away slowly, rather than to be evacuated with a sudden burst.

False pains generally come on at night; and not unfrequently they will annoy the patient for weeks before the commencement of real labour, harassing her much by their severity, and preventing her obtaining any sound, refreshing sleep. At others, they appear only a few hours prior to the accession of uterine action; and in the principal number of instances they are wanting altogether. They are more frequently met with in primary pregnancies than afterwards.

Causes.—Both the seat and causes of false pains are very various. They may be situated in any of the pelvic or abdominal viscera, or in any of the muscles of the lower half of the trunk. Thus the iliaci interni, the psoæ, the abdominal, or the external muscles of the back, may any of them be affected with spasm, consequent on too long a walk, or over exertion, or fatigue of any kind; and these pains are not unlike the throes of parturition. Organic disease of the kidneys or bladder, or a prolapsed state of the latter viscus below the cervix uteri may also occasion the same distress. But the most frequent cause is irritation existing in the lower bowels, or an irregularity in the action of the intestinal canal throughout. Diarrhœa, the evolution of a large quantity of gas, and more particularly constipation, are, of all the many causes, those to which false pains may be most usually traced.

Diagnosis.—It is only in sensation, however, that spurious pains bear any affinity to those of parturition. They differ in their seat, in the irregularity of their return and duration, and in their intensity not progressively increasing; moreover, they are seldom attended by any of the other symptoms which usually accompany the pains

of labour. False pains, then, may be distinguished by their situation: instead of commencing at the lower part of the loins, and being extended to the abdomen and thighs, they are probably felt higher up in the back, or towards one or other side;—by their shifting their position: it is seldom that they are constant to one spot, but mostly erratic;—but they may especially be known by the length of their duration and their irregular returns. Thus true pains at the beginning of labour are short, weak, and the intervals between them long; and they increase in frequency and intensity as the process advances: false pains, on the contrary, observe no kind of regularity either in regard to the periods of their return, or to their progressively becoming more frequent or severe.

But the best criterion by which we can distinguish true from false pains is an examination of the uterus externally through the parietes of the abdomen, and internally by the vagina. If the pains be those of uterine contraction, our hand placed upon the abdomen will detect the uterine structure becoming harder, firmer, denser, and somewhat smaller, with each pain, until it arrives at its acmé; it then more or less slowly relaxes, and acquires the same degree of flaccidity which it possessed when the hand was first applied.

Yet it is not in every case where the abdomen becomes harder under pain that uterine contraction is the cause; for it not unfrequently happens that the alteration so perceptible to our sensation is occasioned by spasm of the abdominal muscles. If the fibres of these muscles act irregularly, and embrace the uterus closely, there is communicated to the hand a deceptive feeling of progressively increasing hardness, as though it were the uterus contracting; and it is almost impossible to discriminate between the one cause of pain and the other. But an

examination *per vaginam* will at once clear up the difficulty. If, in the inquiry thus instituted, we find the os uteri at all open—even should its diameter be not larger than will admit the point of the finger—if we find that with each pain its edge becomes stretched like a cord around the membranes which are protruded through it—if we find that the membranes are propelled downwards, and become tense with each pain, retreat and become flaccid when the pain goes off—and if with the recession of the membranes we observe that the os uteri also regains its original flaccidity, we may be sure that the tense condition is produced by a propulsion of the uterine contents, and this can only be effected by a contraction of the uterine fibres; so that such pains are certainly those of labour.

But if, on the contrary, we discover that the mouth of the womb is perfectly close—that there is no attempt at dilatation—no possibility of introducing the finger within it, and yet the patient is complaining of violent pain, and using bearing-down efforts, we may be equally sure that the suffering she is enduring does not arise entirely, if at all, from uterine action. Still it is possible, and not unlikely, that the os uteri may be opened to some extent, that we may be able to feel the presenting part of the child; and the pains, notwithstanding, may be spurious—active labour may not have come on. Even here we may distinguish the true cause by ascertaining whether with each paroxysm the disc of the os uteri becomes tense, and whether at the same time the membranes protrude. If there be no change in the os uteri, even although it will readily give passage to the extremity of the finger, and if there be no propulsion of the membranous bag when the pain is urgent, that pain is assuredly not the result of uterine action.

Whenever any doubt exists, it is necessary that these

examinations should be instituted,—first, of the abdomen, and then of the os uteri, in order to make the case clear. It is probable, that by merely laying the hand on the uterus exteriorly we may be satisfied that it is not uterine pain ; but if that proceeding does not bring conviction, it is right gently and delicately to insist on making the internal examination. The woman may object to this examination being made ; but the information we gain by this simple proceeding is so useful, may save so much anxiety and distress, and so materially regulates our practice, that if deemed absolutely necessary—and unless this be the case, indeed, we ought not to propose it—the point should never be given up. Many a day and night have been spent in anxious watching over a patient, to the great inconvenience of the practitioner, to the destruction of his rest and health, and perhaps to the detriment of his professional character, when there was not the slightest necessity for such close attendance, simply because the patient would not acquiesce in the requisite examination being made.

Treatment.—Since spurious pains are so distressing, since they are producing no good, and since they may so undermine the patient's powers that she may not have strength enough left to go through the fatigues of labour, it is our duty, if possible, to remove them ; and the best treatment for that object is rest in whatever posture is most easy, acting pretty freely on the bowels, and the exhibition of opiates, either by the mouth or by injection. If the bowels be loaded, as is most usually the case, opium in the first instance will do more harm than good ; but after the evacuation of the intestinal canal, that drug is highly useful. Recourse may also be had to opiate liniments, applied to the back, thighs, abdomen, or any other part where the pain is most intense. In plethoric habits, or if there be present inflammatory symptoms, it may be

proper to take blood from the arm; but as a general principle bleeding will not produce permanent alleviation.

In first pregnancies spurious pains are often occasioned by the rigidity of the abdominal muscles, which do not yield as they ought to the enlarging womb. The best means of relief under such circumstances will be found in gentle friction with some emollient application. Care must be taken, however, that this practice be not carried beyond proper bounds; for friction over the abdomen tends to produce uterine contraction, and I have known more than one instance in which liniments rubbed on the part in pain with more than necessary assiduity, and with less than ordinary caution, have excited the premature expulsion and consequent loss of the foetus.

CLASSIFICATION.*

For practical purposes labours may be conveniently divided into four classes:

- 1st, NATURAL,
- 2nd, Difficult,
- 3rd, Preternatural,
- 4th, Complex.

THE FIRST CLASS, OR NATURAL LABOUR, admits of no

* Almost every systematic writer on the subject of midwifery, since the time of Hippocrates, has adopted some classification of labours, according with his own views. The great father of medicine himself was contented with two classes—*natural*, when the head or breech presented; and *preternatural*, when any other part of the child offered itself. Smellie, to this simple arrangement, added a third class—*laborious*; and in some degree changed the meaning of the terms used by Hippocrates. He calls that a natural labour in which uterine action alone accomplishes delivery;—that case laborious, in which manual or instrumental means become necessary;—and that preternatural, when the birth of the trunk precedes that of the head. Baudelocque also divided labours into three classes: *natural*, comprehending all cases which are terminated by the natural powers, whether the head, breech, or inferior extremities present; *preternatural*, those which require the help of art,

subdivisions; and it may be defined, a case in which the head of the child presents;—in which not more than twenty-four hours are occupied from the commencement of true uterine action to the termination of the process;—in which nothing extraordinary happens, nothing of a dangerous or alarming tendency supervenes throughout the whole conduct of the case. And that labour is deemed natural, in the acceptation of the term which I offer, if any part of the head present, even although it be the forehead or face itself, provided all the circumstances enumerated concur.*

but which may be performed by the hand alone; and *laborious*, when instruments become necessary to terminate the delivery. Dewees, after passing a high compliment on Baudelocque, follows his arrangement, but divides instrumental deliveries into two orders—the one accomplished by instruments, which do no injury either to the mother or child; the other by cutting instruments, applied either to the foetal or maternal body. Davis makes four classes: *natural* when the head presents; *preternatural*, when some other part offers itself; *complex*, when accidental circumstances of an embarrassing nature occur; and *instrumental*. Blundell prefers five divisions: *natural*, when the head presents, and the whole labour is terminated in twenty-four hours; *preternatural*, when some other part of the child is the presenting part; labours with *flooding*; *laborious*, when instruments are required; and *anomalous*, when some extraordinary symptoms are superadded. Ashwell makes three: *natural*, *difficult*, and *flooding*. Merriman arranges all labours under two classes only: *eutocia*, (ἐύ, easily, happily, and τόκος, labour,) and *dystocia*, (δύς, with difficulty, and τόκος;) but in the second he introduces fifteen orders embracing every circumstance that can in any way render the case tedious, difficult, or dangerous. Conquest includes all labours in two classes—*natural* and *preternatural*; and divides the second class into six orders. Power classes them also under the two heads, *eutocia* and *dystocia*; and he divides the latter class into three orders—*nervosa*, *mechanica*, and *accidentalis*, into which he introduces twenty-four genera. Ryan makes four classes—*natural*, *preternatural*, *manual*, and *instrumental*; which he subdivides into forty-three orders. Burns multiplies the classes to seven—*natural*, *premature*, *preternatural*, *tedious*, *laborious*, *impracticable*, and *complicated*; all of which terms are sufficiently plain to convey their own meaning. The arrangement I have adopted is Denman's, so far as regards the classes, (which Hamilton also uses); but I have made some alterations in the subdivisions.

* Many authors have regarded natural labour as much more contracted in its features. Thus Mauriceau considered it essential that the foetus should

THE SECOND CLASS—LABORIOUS—is divided into two orders :

A, Lingering.

B, Instrumental.

To constitute this class, also, it is necessary that the head should present ; and the first order defines those labours in which, under a head presentation, more than twenty-four hours is occupied from the commencement to the termination of the case ; but in which there is no necessity for instrumental interference, and during the progress of which no dangerous symptoms arise—nothing calling for anxiety occurs, except the unusual lapse of time.

The second order of this class—*instrumental*—embraces all cases of head presentation which require to be terminated by instruments. It includes two species :

a, those cases which can be managed by the use of instruments perfectly compatible both with the life of the child and of the mother, as well as the safety and continuity of the mother's structures ; such as are terminated by the forceps or vectis.

b, those in which we are compelled to have recourse to instruments incompatible either with the life of the child, or with the safety and continuity of the mother's structures—labours, indeed, which are completed by cutting instruments.

Of this latter species, there are two varieties—

a, some in which the instruments are applied to the

be living ; Burns, that it should have arrived at intra-uterine maturity ; Baudelocque, that the vertex should present ; Merriman, Burns, and Campbell, define it a vertex presentation, under which the face turns into the hollow of the sacrum, before expulsion. There is some difference also in the limit, with regard to time, proposed by different writers : thus Dr. Cooper restricts the period to twelve, and Power to six hours.

foetal body; as when the case is terminated by the use of the perforator.

β , those in which the mother's structures are divided by the scalpel, or some such instrument, as in the Cæsarean or Sigaultean operations.

THE THIRD CLASS—PRETERNATURAL LABOURS—or, in common language, CROSS BIRTHS, includes all cases in which any other part of the child's body than the head presents—the breech, feet, knees, back, belly, sides, shoulders, arms, or hands. In this class we recognise two orders—

A, all those cases in which the lower end of the oval formed by the doubled foetal body offers itself, viz. the breech, or some part of the inferior extremities, as the feet or the knees.

B, those others in which neither the head, breech, nor any part of the lower extremities present. Such are transverse presentations, to which, indeed, the phrase *cross births* ought in propriety to be restricted;—breast, abdomen, side, back, shoulder, neck, elbow, and hand presentations.

INTO THE FOURTH CLASS—COMPLEX LABOURS—may be admitted all those cases which cannot be referred to any of the foregoing divisions; since there are peculiarities appertaining to each which render them both complicated and embarrassing. This class will embrace ten orders, most of them attended with danger, and all with irregularities.

A. Labours complicated with dangerous hæmorrhage.

B. ————— convulsions.

C. ————— rupture of the uterus.

D. ————— lacerated vagina.

E. ————— ruptured bladder.

F. ————— descent of the funis before the head or breech.

G. Labours complicated with descent of one or both hands with the head or breech.

H. ————— syncope unconnected with uterine floodings.

I. Labours in which monsters are produced.

K. Labours complicated with plurality of children.

Three circumstances must strike the attention on this enumeration: first, that there are a number of cases assembled together in one class, without their possessing any affinity to each other; secondly, that some of them are in the highest degree dangerous, while others must not be considered more than ordinarily so; and, thirdly, that in some of them the danger or irregularity is referable to the parent, and in others to the child. Thus, in cases of laceration and convulsions, the cause is to be sought in the system of the mother; but where the funis or hand descends by the side of the head or breech, the irregularity is referable to the ovum, and the cause may be attributed to the arrangement of the contents of the uterine cavity. Each of these orders might indeed be considered a separate class; but I think it better to comprehend them under one general head, in order to prevent a multiplication of classes, which in all nosological arrangements must be both inconvenient and perplexing.

STAGES OF LABOUR.

Most writers agree that it is desirable, for the purpose of clearly understanding the process, to divide labours into certain parts or *stages*; but as there is much difference in the classification adopted by different teachers, so also a diversity has obtained in the number of these stages; some preferring three, as Deuman,

Hamilton, Blundell, Thatcher, and most modern teachers; others four, as Merriman, Velpeau, Romer of Zurich, Bard of New York; and others, again, five, as Hogben, Naegelè, and the German school;—all these stages terminating on the removal of the placenta. I think Denman's arrangement by far the best for practical purposes, and shall therefore describe labours as consisting of three stages: the first terminating with the opening of the os uteri to its full extent, the rupture of the membranes, and the evacuation of the liquor amnii; the second, with the birth of the fœtus; and the third, with the expulsion of the placenta. We might with some show of reason add a fourth stage, considering that to end with the complete closure of the uterine vessels, and the stoppage of every chance of hæmorrhage: but as this last might continue throughout the whole puerperal month, or longer, it may be as well to follow the more ordinary usage, and to regard labour as terminated on the removal of the placenta.

FIRST STAGE—DILATATION OF THE OS UTERI.—The first stage,—that which depends upon the dilatation of the os uteri from its perfectly close state to that of its full diameter,—is generally the longest, the most uncertain in time, and the most tedious both to the attendant and the patient. This stage varies exceedingly in every feature, as, indeed, do all the others. There is a great difference observable in different women, and in the same woman at different labours, in the state of the os uteri soon after the commencement of the process. In some it will be found soft, lax, and yielding,—though not dilated, still dilatable; while in others it is hard, firm, rigid, and unyielding,—not allowing itself to be distended at all by the finger any more than a piece of hard leather would. There are four chief varieties of the

os uteri, during the first stage of labour, as to its character. The first is when it is thick, soft, moist, cool, sensible to the touch—but not painfully so,—having very much the feel of a piece of thick, wet, chamois leather. The second variety is when it is thick, hard, and rigid; perhaps also hot, dry, and tender, and gives a sensation to the finger very much like the touch of a piece of cartilage. Under the third variety, the os uteri is thin, soft, moist, cool, and not painful, its edge feeling like a piece of moist brown paper; and so thin, that through the substance of the cervix the head of the child can be pretty distinctly felt. The fourth is when it is thin also, but hard and rigid, tender or not according to circumstances, having a glazed feel, with its edge surrounding the presenting part of the child, and tightly embracing it, like a piece of whipcord. Under one or other of these varieties we shall always be able to arrange each state of the os uteri soon after the commencement of labour. It may be regarded as most likely to dilate kindly, when it possesses a soft thick feeling, like a piece of wet chamois leather, and is, as it were, chinked. Certainly either of the two soft states gives a better indication of a disposition to dilate, than those which are rigid; and it may be also deemed least inclined to give way, when it is thin and hard, and when the head comes down into the pelvis completely covered with the cervix uteri,—the circular edge resembling whipcord, or wire.

Varieties in the time occupied in dilatation.—As there is almost every variety in the state of the os uteri at the commencement of labour, so also there is great diversity in the time occupied in its opening; sometimes two or three hours only, at others the same number of days, are consumed in the progress of the first stage; and the os

uteri of the same woman will differ much in this respect in her different labours.

Variations in the height of the os uteri.—We also find the os uteri varying exceedingly in situation at the commencement of labour; it is sometimes so high, that we can scarcely feel it when the finger is introduced, as in a common examination; and at others it is so low, that it is met with just within the vagina, and the presentation may be detected through the cervix. A more speedy termination may be expected, *cæteris paribus*, when the head has descended somewhat into the cavity of the pelvis, than when the os uteri is felt nearly at the brim; unless, indeed, the cervix should possess the thin, glazed, hard feeling that I have just described; when we are to anticipate a lingering labour. It is generally to be found about two inches from the vulva, looking backwards to the upper joint of the coxyx; and it is readily discovered by the fore finger of the right hand, or, at any rate, by the two first fingers of the left hand introduced into the vagina.

Relative progress of dilatation.—Again, we observe that the first part of the dilating process usually goes on slower than the after part. Thus, that degree of dilatation under which the organ acquires the diameter of a shilling,—sufficiently large to admit the tips of two fingers,—will perhaps take up a longer period of time than its dilatation from that small size to the full and entire dimension, which easily allows the head of the child to pass through it. This partly arises, perhaps, from the natural disposition in the os uteri to open more readily after it has acquired a certain diameter; but it is owing also in some degree to mechanical action; for when it has become expanded to such an extent as to admit the membranous bag, or any portion of the child's head to occupy its aperture, the protruded part acts like a

wedge, and forcibly distends it. The cause, however, is not entirely and purely mechanical, for it depends in a great measure on the principle of vitality.

Generally speaking, the os uteri dilates with more pain and difficulty, and takes a longer time in the process, during first labours than subsequently. This is by no means an universal remark, although we usually observe that, when women have had a number of children, the dilatation proceeds with comparative ease. Denman accounts for this facility by the observation—"We may presume that a part which is accustomed to perform an office, or undergo a change, acquires a readier disposition to the office or change, according to the number of times it has performed that office, or undergone that change."*

It is quite impossible that we can give even a probable guess as to the time which any particular os uteri will require for the perfection of its dilatation; for sometimes one that has been from the commencement of the labour highly rigid, scarcely showing the least disposition to open, will suddenly become relaxed, and rapidly distend its circle to its full dimensions; while at another, though the part is soft and flaccid, the pains will altogether subside without any apparent cause; the process of dilatation will be suspended, and the labour will remain stationary for hours, without in the least progressing.

The pain experienced during the first stage, although not so intense or acute as in the second, is still more difficult to bear; and is also borne generally with less fortitude. It is, as I stated before, of a different kind from the pains of expulsion; it is a feeling as if some inward part were being torn, or rent asunder. Perhaps it is not altogether in consequence of the peculiar sensations experienced, that the patient does not endure these early pains with so much resignation as those of a more

* *Introd. to Mid., chap. ix. sec. 6.*

expulsive character ; but also from the knowledge which she has gained, either by a previous labour, or in conversation with her friends, that so long as the “ grinding ” pains continue, there is no chance of a speedy release ; but that, as soon as the “ forcing ” pains come on, the labour may quickly be brought to a close ; and *every next*, she thinks, may terminate her sufferings. As soon as the pains become changed in their character, hope is infused, fresh spirits are instilled, and thus the patient’s powers are sustained.

If the labour be progressing regularly, the pain subsides and again returns ; thus intermissions alternate with paroxysms of suffering ; and if the woman be in other respects well, and in good spirits, she will often fall into a dose, and obtain a refreshing slumber during the intervals of uterine action : each pain, when it returns, awakening her from the delicious state of oblivion and repose, to a fearful consciousness of the trials she has to undergo.

Rupture of the membranes.—With each pain the membranes are more or less protruded through the os uteri, so that they become tense, and the circle of the dilated mouth is drawn tightly around them. (Plate 33 shows the membranous cyst passing through the mouth of the womb, and occupying a portion of the vagina.) In the interval of pain, when the uterus exerts no pressure from above, the membranes retreat, become flaccid, and are scarcely to be felt ; and as there is little or no water then intervening between the finger and the person of the child, its presenting part can usually be distinctly discerned. Such a state of alternate protrusion and retrocession of a part of the membranous cyst continues an uncertain time ; when under one of these painful contractions the membranes will burst, the liquor amnii will be evacuated, and the head of the child will come to bear, with each

paroxysm, against the internal surface of the os and cervix uteri. On the breaking of the membranes, the first stage of labour has terminated.

Variations in the period when the membranes rupture.—

I have thus described the progress of a labour prior to the rupture of the membranes, taking it for granted that the liquor amnii will not be evacuated until the os uteri is dilated to nearly its full extent; but these two occurrences,—the full dilatation of the os uteri, and the rupture of the membranous cyst,—are not always found in practice to correspond with regard to time: for sometimes the membranes break before the aperture is dilated even to the size of a shilling; while at others they protrude considerably through that organ before they rupture; the head of the child having descended so low as to occupy the cavity of the pelvis, and the os uteri having been widely open for some considerable time. Generally the membranes burst when the mouth of the womb has become dilated to a size sufficient to admit the hand; and we may presume that where such a degree of dilatation exists, the next two or three pains will expel the head entirely through its orifice.

According as the membranes are more or less rigid, and the mouth of the womb more or less yielding, will be the time consumed previously to the discharge of the waters. When the os uteri is soft, and the membranous bag tough, it will probably be long before this evacuation takes place; but when it is rigid, and the membranes are thin and tender, they generally break early. The period at which the membranes rupture, therefore, will not only depend upon their own toughness or tenuity, but it will also be regulated by the pressure which the edge of the os uteri exerts on them while they are protruded through it. The more lax is the os uteri, the less is the compression on the extruded portion of the cyst, because it

then distends to the power operating from within: but if it be rigid, the pressure is great; for then the inner margin closely and strongly embraces the tense membranes all around, producing by its very resistance a deep circular groove; and thus disposing the bag to premature laceration.

It is desirable in practice to preserve the membranous bag entire as long as possible; or, at least, until it has performed the whole of the office destined for it by nature;—namely, the dilatation of the os uteri, the vagina, and somewhat of the external parts. When the membranes appear externally to the vulva, indeed, we may suppose that they have then effected all the good that can be expected from them; that their remaining entire may possibly be retarding the labour; and we may in that case venture to rupture them, provided the head present. But it is one of the first axioms to be learned in obstetric practice, not officiously or unnecessarily to destroy the cyst, so long as any advantage can be gained by its dilating powers.

SECOND STAGE—PASSAGE OF THE FŒTUS THROUGH THE PELVIS.—From the foregoing remarks it may be gathered that, after an uncertain time, the os uteri becomes fully dilated; the membranes burst; the liquor amnii is evacuated, generally in a full stream; and the second stage of labour commences.

Modes in which the vertex presents.—The passage of the head through the brim of the pelvis forms the first part of the second stage. It is probable, indeed, that the head may have descended considerably into the cavity before the waters flow away; but it is also possible that it may scarcely have engaged itself even in the brim, when this crisis in the process occurs. It has been already shown, that of all the points of the head, the vertex is most usually presenting; and it has also been

proved that this is a most wise and beneficent provision of nature, because in that position the foetal skull will pass through an aperture of less dimensions than in any other. The vertex then depending, there are eight different directions in which the head may be placed, requiring our consideration, in a view to practical utility. The first is with the face inclining to the right ilium; the right ear being behind the symphysis pubis; the left ear towards the spinal column; and the occiput inclined to the left ilium. (Plate 34, fig. 1.) The second is the reverse of this position: the face inclines to the left ilium; the occiput to the right ilium; the right ear lies towards the promontory of the sacrum; the left ear behind the symphysis pubis. (Plate 34, fig. 2.) The third mode is, when the head is placed diagonally, the face looking to the right sacro-iliac synchondrosis; the right ear to the right groin; the left ear to the left sacro-iliac synchondrosis; and the occiput behind the left groin. (Plate 35, fig. 1.) The fourth position is the reverse of this again, where the face is placed against the left sacro-iliac synchondrosis; the occiput behind the right groin; the right ear against the right sacro-iliac synchondrosis: and the left ear behind the left groin. (Plate 35, fig. 2.) The fifth position is where the face is looking towards the right groin; the occiput to the left sacro-iliac synchondrosis; the right ear to the left groin; and the left ear to the right sacro-iliac synchondrosis. (Plate 36, fig. 1.) The sixth position is where this is reversed, the face looking towards the left groin; the occiput to the right sacro-iliac synchondrosis; the right ear to the left sacro-iliac synchondrosis; and the left ear to the right groin. (Plate 36, fig. 2.) The seventh is where the head attempts the passage with the forehead immediately against the promontory of the sacrum; the right ear to the right ilium; the left ear to the left ilium; and

the occiput behind the symphysis pubis. (Plate 37, fig. 1.) And the eighth, where this position is reversed, the occiput being exactly against the promontory of the sacrum; the forehead impinging on the symphysis pubis; the right ear to the left ilium; the left ear to the right ilium. (Plate 37, fig. 2).

Comparative frequency of the various modes of vertex presentation.—Of these presentations, the first four are by far the most frequent;—that is, when the face either looks directly to one ilium or the opposite; or diagonally to one sacro-iliac synchondrosis or to the other. Under either of these positions, the natural inclination of the head is to descend into the pelvic cavity in the same direction in which it cleared the brim, until it reaches the outlet, and then to turn with the face into the hollow of the sacrum, and the occiput under the arch of the pubes, the face being expelled, sweeping the perineum. When such is the original situation of the head, the labour is more easily accomplished than under any other. It is supposed that the face is more commonly inclined towards the right side than the left; and this accords with my own more recent observations.

Of the next four presentations, the fifth and sixth are the most frequent, viz. where the face is looking diagonally to one or other groin, and the occiput to one or other sacro-iliac synchondrosis. These are not very frequent cases, but they are occasionally met with, and the head is seldom so speedily expelled as in either of the first four. In these situations, the natural inclination of the head is to pass down diagonally till it comes to the outlet of the pelvis, and then to turn with the face under the arch of the pubes and the occiput into the hollow of the sacrum. Much more room is required for the exit of the skull with the face forwards, than when it is thrown back into the sacral curve; because its gene-

ral figure is then not so well adapted to the pelvic cavity; but especially because the expanded brow does not so easily insinuate itself between the rami of the pubic arch as the more conical vertex does. For this reason the occiput is pressed more powerfully backwards before expulsion takes place; the coxyx is put more upon the stretch, and the perineum is also more extended.

Yet, although the natural inclination of the face would be to appear under the pubes in its exit when it was originally directed to either groin, it is by no means uncommon for the head, in its passage through the pelvis, to turn with the face into the sacral cavity, and to be expelled in the same manner as though the face had from the commencement been inclined laterally or diagonally backwards. These irregular positions of the head are frequent causes for the necessity of instrumental interference.

The seventh and eighth cases of vertex presentations—where the face attempts the passage, being placed directly against the promontory of the sacrum, or above the symphysis pubis—are the most infrequent of all the eight; they are so rare, that some practitioners of considerable experience tell us they never met with them. Naegelè* and other German authors deny the existence of such a case; and Campbell† doubts the possibility of its occurrence.

As in the early part of this work it was demonstrated that the foetal cranium, from occiput to forehead, measures four inches and a half, while the sacro-pubal diameter of the pelvis at the brim possesses only four inches of clear available space; it is evident that, although the head might present in the seventh or eighth position, it cannot enter the pelvis in either of those directions.

* Essay on the Mechanism of Parturition. By Rigby, preface, p. 16.

† Introduction to Midwifery, p. 244.

Before, then, it can engage in the superior strait, it is compelled to turn, with the face somewhat towards the right or the left side. I have certainly never been called upon to deliver by instruments when the head occupied either of the unfortunate situations now under discussion; but I have known them to obtain at the commencement of labour; and I have traced the head make a turn with the face to one or other side, being forced into that position by the strength of the uterine contractions, in an analogous manner to the turn effected in all natural labours, when it is on the point of being expelled through the outlet. I think, therefore, the assertion, that such a presentation never occurs, or is impossible, far too general and sweeping; and a case detailed by Mr. Radford* proves that my opinion is correct.

Phenomena observed during the second stage.—When the mouth of the womb is entirely dilated—whether that occurrence have taken place previously to, or after the rupture of the membranes—it becomes as it were obliterated, the vaginal and uterine cavities form one continuous canal, and the division between them is not easily discernible until after the child's expulsion. The discharge of the liquor amnii is usually followed by a respite from pain, of rather longer duration than had been experienced for some time before; but when the uterine contractions return, they are mostly increased, both in length and strength; they are more forcing, and are attended with bearing-down efforts of greater or less violence. Under these expulsive throes, the pulse, which was quicker than ordinary during the first stage, becomes even more accelerated; there is increased heat of skin, and soon a copious perspiration breaks out; the mouth often becomes parched; the breath is held in; and those voluntary muscles, whose action assists the uterus, are

* Essays on Midwifery. No. 2.

called powerfully into requisition, to aid the uterine energies. The patient tightly grasps whatever can give her steadiness and support, places her feet against some unyielding point, suspends her respiration, and strains with all her might. Although the pains during the progress of the second stage are stronger than in the first, still the intermissions are more decided, and the intervals of ease more perfect: they are endured with more composure and fortitude; and the woman usually slumbers between each paroxysm, even although she had been unable to sleep earlier in the process, in consequence of her irritability or anxiety. This inclination to dose should be indulged, as it keeps the mind in a quiet and calm state, refreshes the spirits, and restores the bodily powers. At other times, from the moment the liquor amnii is evacuated, the efforts of the uterus become redoubled, as though some fresh excitement was applied; and this may probably arise from the os uteri being irritated more by the bony head than by the soft cushion previously interposed between itself and the presenting part.

After the escape of the liquor amnii, the fœtal body is more or less compressed, in proportion to the uterine exertions, and the resistance offered by the passages. It is therefore folded into lesser space, and the chin is directed more forcibly against the chest, so that the neck is bent more into a curve.

Progression and recession of the head.—I have before mentioned, that the membranous bag, while entire, is tense, and protruded during each pain; that it becomes lax, and the water recedes, when the pain goes off. The same thing also happens with regard to the head, so far as protrusion and retrocession are concerned. After the membranes are broken, it is forced a little downwards with each contraction; and in the absence of pain re-

treats, sometimes to a considerable extent. This is particularly remarkable when it is passing through the outlet of the pelvis. At that period of the labour it may be almost entirely expelled during the urgency of the pain ; and when remission occurs, it will recede and be again perfectly buried within the genital fissure, so that the labia close around it. To such an extent is this recession sometimes carried, that it may give those not well acquainted with the process an idea that the uterus has ruptured, and that the child's body has passed partly into the abdominal cavity. And here again we cannot help remarking the beauty of nature's ordinances : it is impossible, indeed, to contemplate a single provision, even of the minutest character, adapted to the exigencies of gestation and labour, without being fervidly and awfully impressed with the extent of that Wisdom, Power, and Beneficence, which established the laws, and controls their operations.

The advantage of this retrocession consists in the removal, for a time, of that distending pressure which obtains when the head is propelled downwards. If there existed a constant urging forward, without the least relief to the parts, throughout the whole progress of the labour,—even under the most common natural case, in which not more than the usual time was consumed,—the soft structures must suffer very considerable injury ; the vessels must be more or less strangulated ; the circulation would be suspended or impeded ; inflammation would almost be a necessary consequence ; and gangrene would generally follow. We are, therefore, to hail this recession of the head in its progress through the pelvis as a fortunate occurrence for the woman ; since it relieves her from present pain and future danger. It is also to be regarded as a good sign, inasmuch as it proves that the cavity of the pelvis is tolerably capacious.

When the head has entered so low into the pelvis that the forehead and occiput impinge respectively on the internal surface of the tuberosities of each ischium,—inasmuch as the long diameter of the head, while in this situation, is opposed to the short diameter of the pelvic outlet, and exceeds that diameter by half an inch, it is impossible for it to escape in that direction. A change is consequently effected: the face is thrown into the hollow of the sacrum, and the occiput under the arch of the pubes. This alteration in position, however, does not commence until the head is fully lodged within the pelvic cavity.*

Compression of the head.—We also remark—especially in first labours, or any case where there is much resistance—that the head, from pressure, assumes somewhat of a conical figure, the bones of the cranium overlapping each other, so as to diminish the lateral diameter. In consequence of this decrease in volume, the scalp becomes corrugated,—puckered at the vertex into three or four folds, very evident to the touch, and observable, *cæteris paribus*, in the same degree as the head is compressed. Pressure to such an extent is seldom injurious. After a time, however, when the head has remained long within the pelvis, and especially if it be impacted, this corrugated feeling of the scalp disappears; and instead of it, a soft puffy tumor is observed in the same situation.

While the head thus continues in the pelvis, both before and after its turn is effected,—being compressed by the pelvic bones, and reciprocally exerting equivalent pressure on the soft structures within the cavity,—another most distressing symptom often arises, bringing with it great increase of suffering, but not generally interfering with uterine action, or retarding the progress of the labour;—I allude to cramp, of the most violent

* Plate 38 shows the head occupying the pelvic cavity, the face being directed to the right side.

character, affecting the calf and sole of the foot. This is consequent on the compression to which the great sciatic nerve is exposed at this stage of the process; and is so painful that the patient can scarcely restrain her screams.

Exit of the head.—The vertex, then, of all the cranial surface, first appears externally, and as it descends lower and lower, the labia become opened; the anus dilated; the perineum distended, heated, and very much thinned; so that it feels almost like wet vellum.* In this way, retreating when the pain goes off, and advancing when it returns, the face sweeps along the sacrum, coxyx, and perineum; the chin slowly recedes from the chest; the occiput turns up under the arch of the pubes; the perineum slips back over the partially extruded face; and the head is by degrees expelled. On its entire expulsion the face is directed towards one or other thigh. (Plate 41.)

During the passage of the head externally, the pains are even more forcing than have yet been experienced: the woman bears down more strongly, makes a greater effort, and calls forth the utmost power of the abdominal muscles and diaphragm, to aid the uterine contractions. It appears as if all the vital energies were directed towards the accomplishment of the object nature has in view: most of the muscles of the body participate in the general struggle; a violent trembling, which it is impossible to control, frequently pervades the whole frame; and at the moment the head emerges, a piercing shriek

* In plate 40, copied from Smellie, the child's head *a*, is seen separating the labia; the extension, thinning, and protrusion of the perineum *b*, caused by the head's descent, and called by some *the perineal tumor*, are also well portrayed; *d* marks the point of the coxyx; *e* the anus dilated, so that the inner membrane of the rectum is to some extent exposed to the contact of the hand, when applied for the protection of the structures. This exposure is not injurious; no harm arises from it; and sometimes it is even greater than is represented here.

will mostly escape the patient, as though involuntarily. When the head is on the point of passing, the contents of the rectum are usually squeezed out; and on its entire protrusion, the perineum, from its own elasticity, recovers its former size and appearance; it is collected round the neck of the child,—the woman is completely relieved from the distending force, and consequently from the agony she endured. She will now generally express some strong sentiment of gratitude and joy; or perhaps her feelings will only find utterance in tears.

Under all states of the system, the sudden removal of intense pain brings with it a sensation of positive pleasure; and in no case is the instantaneous transition from extreme misery to actual joy more conspicuous than immediately on the delivery of the head; and this especially if it be a primary labour; to which, indeed, the preceding remarks are more particularly applicable. A longer interval of ease will probably follow the expulsion of the cranium than had occurred since the perineum first began to be extended. In a very few minutes, however, action is again established, for the purpose of completing the delivery.

Exit of the body of the child.—After the head has effected its turn, with the face into the hollow of the sacrum, and is passing through the outlet of the pelvis, with its long diameter in the same direction as the long diameter of the inferior aperture,—namely, from the fore to the back part,—the shoulders are at the same moment entering the cavity, and passing through the brim, with their long diameter in the same direction as one of the long diameters of the superior aperture, which is diagonally from side to side; so that the child is here adapted, both as it regards its head and its shoulders, to the pelvis, in such a way as to make its transit the most easily.* After the head is born, however, when the

* Plate 39 represents the face traversing the sacral cavity, after the head has

shoulders have come down to press upon the outlet of the pelvis, their long diameter is opposed to the short diameter of the outlet, and they seldom can make their exit in this situation, unless the child be small or ill-formed: but most usually they also effect a turn, similar to the turn already described by the head; one of them being directed into the cavity of the sacrum, and the other insinuating itself under the arch of the pubes. Through the inferior aperture of the pelvis, then, the child is expelled sideways, one shoulder and arm distending the perineum, and the other offering itself anteriorly. (Plate 41.) One pain may be sufficient to effect this turn and expel the shoulders; or two or three may be required.

When the foetal body is so far protruded that the parts are again distended by the shoulders, the patient experiences a return of pain; not such violent agony, certainly, as when the head was being expelled, but the same feeling of forcible distension,—the same sensation as if the parts were being rent. A short time only elapses before the uterus resumes its action, to expel the breech; the child in the interval remaining half born, the perineum somewhat on the stretch. As the breech takes up less room than either the head or shoulders, it is usually extruded with slight exertion; the legs and feet either pass directly, or

made its turn. The shoulders are seen passing through the brim, with the left directed towards the right groin, and the right opposite to the left sacro-iliac symphysis; the original presentation of the head having been the vertex with the face to the right ilium. In most of the plates which describe this position of the foetal head, the body is also turned quite round, with the abdomen looking directly towards the mother's spine. From repeated observation, I am persuaded that this is not correct; that the body still in utero is not turned in the same proportion as is the head; and that the cervical, dorsal, and lumbar vertebræ are somewhat twisted; so that the breech and lower part of the trunk retain their original situation in regard to the mother's body, although the head has been so materially altered in respect to that which it occupies. This is proved by the child's face being directed to one of the woman's thighs immediately on its expulsion.

remain a minute or two in the vagina, and are ultimately expelled by the vaginal fibres: the birth of the child is then perfected, and the second stage of the labour brought to a close.

The time occupied by the passage of the child, after the rupture of the membranes, is as uncertain as the period required for the dilatation of the os uteri and the accomplishment of the first stage. Sometimes the same pain under which the membranes burst, expels the head, and perhaps the body also; at others, very many hours of wearying suffering are sustained before the head emerges; and the same uncertainty with regard to time applies—but in a very limited degree—to the passage of the shoulders after the head is born; sometimes scarce a moment intervenes, sometimes a considerable space; usually, however, the child is entirely expelled within five minutes after the head has passed.

The symptoms of a speedy termination to the labour are, that from the beginning we should find the os uteri lax, soft, thick, moist, cool, and not tender; that we should find the vagina also soft, moist, relaxed, and cool, and the perineum easily distensible; the pelvis well formed; the head directed with the face laterally, or looking diagonally backwards, with the vertex downwards. With such indications, if the woman be in good health, and the pains pretty active, we may expect a speedy termination to the case.

The symptoms foreboding a tedious labour are exactly the contrary to those I have just mentioned:—that we should find the os uteri thin, hard, unyielding, dry, and tender, and feeling round the presenting part of the head as if a cord were tightly encircling it; that the vagina and perineum should be dry, hot, narrow, and constricted; that the head should be wrongly placed; the pelvis small; or the uterine action feeble: any of

these features displaying themselves will indicate the probability of a protracted struggle.

Usually, when the os uteri has been preternaturally rigid, the soft structures towards the outlet of the pelvis are also indisposed to yield, and the labour is therefore tedious from the commencement to the close : but this is by no means always so ; for sometimes these parts will give way very easily after the os uteri has opened with great difficulty ; and in other cases they will be very rigid, when the os uteri has dilated tolerably easily. It may be looked upon as a general rule, that the vagina and perineum are least disposed to dilate in first labours ; and this observation is more universally applicable to them than to the mouth of the womb. We very seldom, indeed, find either of these organs more rigid in subsequent labours than in the first, unless that rigidity is the consequence of a cicatrix produced by sloughing. It is possible that after a difficult labour inflammation of the vagina may occur, which may terminate in slough ; the slough will separate, the ulcer will heal, a puckering will take place, and a cicatrix will be left ; by which processes the capacity of the canal is much diminished, and its dilatability impaired : but this is an accidental occurrence, and must be reserved for future consideration.

THIRD STAGE.—The second stage being terminated on the birth of the child, the third consists in a continuation of the same efforts for the expulsion of the placenta.

Varieties in the time occupied in the expulsion of the placenta.—This stage also varies much in respect to time : if the uterus be vigorous and active, the placenta is generally expelled quickly ; but if uterine action has been feeble during the former parts of the process (particularly if the labour has been lingering, or the child has been extracted by mechanical means,) a comparatively long

period usually elapses before it passes. In some instances, indeed, the uterus does not act to expel it at all, and the introduction of the hand is required for its removal. I have sometimes known the placenta thrown out of the vagina by the same pain that expelled the child: more frequently, ten, fifteen, or twenty minutes, elapse before it escapes wholly from the uterus into the vagina, and even then it may lie in that cavity for hours before it clears the os externum. Those contractions, by which the expulsion of the placenta from the uterus is effected, are also attended with suffering; not, indeed, nearly approaching the violence of the pains under which the fœtus was born, but more like the uneasy sensations experienced during the commencement of the first stage: they are referred principally to the loins and upper region of the sacrum, and are scarcely complained of. It is seldom that a single pain expels it even out of the uterine cavity; more frequently three or four follow each other, at tolerably regular intervals; and it descends into the vagina by degrees.

When it has passed from the uterus—if the case be left entirely to the natural powers—the muscular fibres of the vagina complete its extrusion; but as this canal has suffered severe and unusual distention during the birth of the child, we cannot expect that the muscular coat will regain its previous tone in an instant, so completely as to embrace the mass firmly and expel it immediately. It consequently remains within the vagina, until the fibres have recovered sufficiently to act upon it. This requires a very different period in different instances: sometimes five or six hours will elapse; most usually it is protruded within the hour.

Separation of the placenta from its uterine attachment.—Previously, however, to the placenta being expelled out of the uterine cavity, it must be separated from its uterine

attachment. This separation is produced exactly by the same action which causes its extrusion,—uterine contraction. After the birth of the infant, the general volume of the uterus and the capacity of its cavity being diminished in proportion to the degree of contraction it has undergone, it necessarily follows that the uterine surface, before occupied by the placenta, is proportionably decreased, and shrinks into a less space.

As the placenta is a perfectly passive body—as there is no power inherent within its own structure, by which its maternal face can be diminished in any degree corresponding with the diminution of the internal surface of the uterus—the very shrinking of the uterine parietes occasions it to lose its former hold; it spontaneously falls from its attachment, and would remain loose in the uterine cavity, unless extruded by a continuance of uterine action. This simple contraction, then, causing the uterine membrane to slip away from the placental surface, both separates it from its connexion and expels it from its cavity. The placenta passes through the vagina inverted, so that its foetal face becomes external; the membranes attached to it are also turned inside outwards, and are flapped over its maternal surface. There is always a loss of more or less blood accompanying the separation of the placenta; and this blood appears externally upon the linen. The quantity varies to a great extent; sometimes it does not exceed an ounce or two; at others it amounts to many pints, constituting a most violent hæmorrhage.

Even after the placenta has been expelled from the uterine and vaginal cavities, the process of uterine contraction does not cease, but continues for the purpose of arresting the flow of blood by the closure of the vessels; for preventing the possibility of the womb being inverted; and for silently and gradually decreas-

ing the bulk of the organ to its former small unimpregnated state. Should the uterus not contract, in proportion to the flaccidity of its parietes, the distensibility of its cavity, and the perviousness of its vessels, would be the danger of hæmorrhage. It does not perhaps necessarily follow that dangerous flooding must occur, even although the contraction were imperfect; because it is possible that coagula might form at the open apertures of the uterine vessels which were previously closed by the apposition of the placenta; and if the heart's action were not powerful enough to dislodge those coagula, the loss of much blood might be by them prevented. But this kind of plug is a most inefficient security against all varieties of uterine hæmorrhage; and no woman can be considered safe from flooding until the uterus is firmly, entirely, and permanently contracted.

Every one who has seen much of obstetric practice must have been struck with the fortitude and resignation with which women bear the agonizing throes of parturition, and the rapidity with which the system recovers from the lengthened suffering, and regains its average balance. This must be regarded as one of Nature's greatest mercies; but there is this grand difference between the pain of labour and all other pains—the one is unnatural, and dependent on morbid actions, influencing for the time the condition of the organ affected; the other is natural, and inseparably connected with the performance of a healthy function.

DUTIES OF THE MEDICAL ATTENDANT UNDER NATURAL LABOUR.

From the knowledge which the foregoing pages will afford of the beneficence displayed by nature throughout

the processes of utero-gestation and labour; and of the admirable contrivances adopted by her to overcome difficulties and avert dangers, it will be evident that in a very large proportion of cases the duties of the obstetrician must be few and simple. Generally, indeed, no *active* assistance is necessary, until after the birth of the child; all that is required of the attendant being, that he should remain an observant, though unofficious, spectator of the process;—ready to exert himself, with promptitude and energy, on the first accession of any alarming symptom; but equally, or more, ready to allow the changes necessary for the completion of nature's object to proceed, uninterrupted by any meddlesome interference: for no maxim in obstetric science is of more universal application, than that unnecessary “assistance,”—rendered with the view of expediting the termination of the case, or shortening the sufferings of the patient—is not only useless, but in the highest degree injurious, and well calculated to defeat its own end.

Let it not be supposed this declaration includes the admission, that a *partial* acquaintance with the obstetric branch of medicine is sufficient for the safe practice of the profession; for although, in thirty-nine cases out of forty, little is required to be done beyond protecting the extended structures from injury, separating the child, and extracting the placenta from the vagina—after its total exclusion from the uterine cavity—still, in the fortieth, danger may occur, only to be arrested by the promptest, the most decisive, and most judiciously directed help.

Much knowledge is necessary to discriminate the kind of cases in which assistance is proper, and determine the time at which that assistance ought to be employed, as well as the mode of its application. It is this which distinguishes the scientific from the ignorant obstetrician;

—it is this important knowledge on which the life, the future health and comfort, of many a parturient woman must depend;—which, nevertheless, has been held in such low estimation by some members of the profession, as to be thought unworthy of cultivation by the scientific and literary mind;—unfit to be possessed by men of respectable station in society; and the adaptation of which knowledge to practice has been characterised in an official document under the seal of the highest of our medical corporate associations, as “an art foreign to the habits of gentlemen of enlarged academical education.”*

No one can read this sentiment without feeling that it is both inconsiderate and unjust. To omit, indeed, any particular mention of the science and judgment requisite to treat such perilous accidents as hæmorrhage, in all its varieties, and convulsions, a most important question,—involving no less than the destruction of foetal life,—is often painfully forced upon the attention of the obstetric practitioner. He is by no means very unfrequently called upon to decide whether the delivery can safely be trusted to the natural powers, or requires to be terminated by artificial aid; and whether means may be used compatible with the child's safety, or the horrible alter-

* Letter from the Royal College of Physicians to the Secretary of State for the Home Department, dated May 2nd, 1827, in reply to a memorial from the Obstetric Society. In the same communication it is asserted “that the most successful practice of midwifery requires no such laborious preliminary study,” (as is necessary for the practice of medicine,) “else discreet matrons, and plain uneducated men in the country, who frequently arrive at great notoriety in this calling, would not acquire that credit which they often attain.” Since that time, however, the College have virtually acknowledged that they had formed an erroneous estimate of the amount of information required for the successful practice of obstetric medicine; for, permitting their own prejudices to vanish before the increasing acquirements of the general profession, they have recently annulled their bye-law, which placed the honours of the fellowship beyond the reach of obstetric practitioners.

native must be had recourse to, of sacrificing the infant to preserve the mother.—Is it of no importance that this should be determined by an educated, intelligent, and *practical* man?—Is it right that questions of such vital interest should be left to the decision of one but *partially* qualified to answer it?—And can we suppose that any person can form a proper estimate of the powers with which nature is endowed to surmount the impediments, and overcome the dangers, that occasionally embarrass parturition, unless he have the opportunity continually before him of watching her operations in the more ordinary cases?—For these, if for no other reasons, the interests of the public must be best protected when the obstetrical branch of medicine and surgery is undertaken,—in common with the other duties of those sciences,—by persons who have qualified themselves, by their medical studies, for the conduct of the most dangerous casualties, and who are entitled, by their rank in society, and their preliminary education, to the consideration of gentlemen.

It can scarcely be necessary that I should insist on the obligation we lie under to obey every summons to an obstetric patient as speedily as possible: for even although a former one may have been lingering, it by no means follows that the subsequent labours should be of the same nature; and a practitioner must subject himself to much annoyance and blame, if, through remissness or negligence on his part, he should find the case terminated on his arrival. It is always right—however little is required to be done—that the medical attendant should be present during the chief period of the process, that he may be at hand to employ such means as any emergency may render requisite.

A lancet and a female catheter are the only instruments with which the obstetrical practitioner need

furnish his pocket case; sufficient time will generally be afforded him for procuring any others he may want, even in the most urgent cases. He will find it convenient, however, especially in country practice, to carry with him two or three drachms of laudanum.

It is not often that we are called upon to choose the apartment in which the woman should pass the puerperal month, as she is usually delivered in her own bedroom; but if that advantage be afforded us, we should make choice of one that is spacious and airy, with a dressing-closet or ante-room attached to it, and at a convenient distance from the domestic offices.

Nor, perhaps, are we generally expected to regulate the number of individuals to be present; though we may be called upon not unfrequently to exercise our authority in this respect. Bearing in mind that the room should be kept as noiseless as possible, there are yet some attendants whose services we cannot dispense with. The only persons whom I would willingly admit are the nurse and some female married friend,—the mother, or other near relation, or an intimate acquaintance,—to act as confidante to the sufferer,—into whose sympathising ear she may whisper all her grievances and distresses, and from whom she may receive those numberless comforts and sustaining consolations of which she stands so eminently in need. Unmarried females are neither the most fit companions for the patient, nor the most useful assistants to the practitioner. In addition, it is proper that a servant should be in attendance in the ante-room, or close at hand, that she may be ready to bring whatever may be wanted from a distant part of the house without delay; and she should have no duty imposed on her for the time, except an obedience to the orders that may issue from her mistress's chamber.

On arriving at the patient's residence it is better not

abruptly to obtrude oneself into her presence, unless there be some immediate necessity for our attendance. Information should be sought from the nurse on such points as will enable us to judge whether labour has actually commenced. On being ushered into her chamber, we may engage her in some general conversation, which will give us an opportunity of observing the frequency, duration, strength, and character of the pains; and our conduct must be framed accordingly. Should they be of trifling importance, we may content ourselves with giving some ordinary directions, and retire from the apartment. But if they are returning with frequency and activity, we must not allow much time to elapse before we require to make an examination *per vaginam*.

An objection may be raised by the patient to the necessary examination being then instituted, under the idea that *no assistance* can be rendered her so early in the labour. As I would regard the feelings of a parturient woman in a degree only secondary to her safety, I would by no means insist on putting her to this inconvenience, unless I thought it quite indispensable. But, as much valuable information may be gained by this first examination, and as it is highly desirable to obtain that information during the progress of the first stage, it is right firmly but gently to urge its propriety. It is seldom, indeed, that she will not accede to the recommendation of her medical attendant, provided he possesses her confidence, and conveys his request with becoming delicacy.

Much knowledge must be acquired during the first vaginal examination: it is, first, whether the woman be pregnant; secondly, if she be in labour; thirdly, whether the membranes have ruptured, or are still entire; fourthly, how the child is presenting; fifthly, how far the labour is advanced; and sixthly, the state of the os uteri, vagina, and perineum, in regard to their distensibility.

It may be thought superfluous to recommend that one of the points of inquiry should be whether pregnancy really exists, under the supposition that no woman could believe herself in labour unless she had approached near the termination of utero-gestation. But instances are daily occurring which prove the fallacy of this mode of reasoning; and on many occasions professional men have been in attendance for days and weeks, relying on their patient's assurances, perhaps often advanced, that she was with child, when it has turned out she was mistaken. They have thus most undeservedly exposed themselves to some censure, or, what is perhaps more mischievous than direct censure, to quizzical innuendos and sarcastic ridicule.

Many unhealthy actions will cause the abdomen to swell,—especially about the period of the cessation of the menstrual discharge,—and to simulate the external appearance of gestation; and even in the absence of pregnancy, spasms of different muscles may sometimes tolerably closely imitate, as to sensation, situation, and severity, the commencing pains of labour. While this gradual enlargement is going on, the woman will find no difficulty in persuading herself, or in being persuaded by others, that she is pregnant; and when the spasmodic pains set in, she will as readily conclude that labour has begun. Under such circumstances, the medical attendant has probably no opportunity of forming a correct judgment, except from his personal observations at the time he is hastily summoned.

Provided the uterus be unimpregnated the deception may generally be detected, simply by placing the hand on the abdomen; but if that proceeding does not afford the required information, an examination *per vaginam* can scarcely fail to prove satisfactory. On placing the hand on the abdomen externally, it will be found dis-

tended—perhaps from flatus pent up in the intestines—perhaps from fluid effused into the peritoneal cavity—or from the presence of some more solid tumour. We may distinguish that the swelling is softer or harder, larger or smaller, more diffused or more circumscribed, than is the bulk of the gravid uterus; that it is not of the same shape, is very likely irregular on its surface, does not occupy the same position, and, above all, that it does not possess that peculiar springy elasticity which so strongly characterises the impregnated womb at the end of the natural term of gestation. If there still remains any doubt, it is right to make a vaginal examination. Under this condition of *spurious pregnancy* the os uteri will be found not only close, but undeveloped; the cervix not expanded; and the uterus itself, on poising it at the extremity of the finger, will be felt small, light, and moveable;—provided, indeed, it be not diseased. If, on the contrary, the patient be pregnant, and near the end of the term, we shall find the os and cervix uteri fully developed and expanded, and perhaps the os uteri somewhat open; so that we may be able to detect the presence of a foetus through the dilated mouth or thinned neck.

But the patient may be pregnant and not in labour,—the pains may be spurious and not true. If what has been already advanced in regard to false pains be carefully studied, I trust there will be no great difficulty in forming a diagnosis. We will presume, as indeed we shall find most usually the case, that the patient, on our arrival, is in the first stage of labour, experiencing the dilating or *grinding* pains.

Position of the patient.—The most convenient as well as easy posture which the patient can take, and that which seems best adapted for facilitating the descent of the head through the pelvic brim, is the one usually chosen in this country—the left side, with the shoulders

inclined forwards, so that the spine may be somewhat curved, the thighs flexed upon the pelvis, and the legs bent upon the thighs. In this position, as has been before shown, the axis of the pelvic entrance is brought, as nearly as can be accomplished, into a line with the axis of the trunk; and the muscles passing over the pelvic brim, particularly the *psoæ*, are more perfectly relaxed than in any other.*

It is better that she should be undressed, excepting her night-clothes and a dressing-gown; and that she should lie on a mattrass rather than a softer bed. She should be also covered by a light counterpane, or blanket, and a sheet.

In this position *the vaginal examination* is to be conducted in the following manner:—The attendant sitting rather behind her, and having anointed the two first fingers of his *right* hand with some unctuous substance, mostly in readiness, is to place them on the labia externa; then gently separating these organs, he must introduce the first finger into the vagina in the direction of its entrance, which is backwards and upwards: or he may take the perineum as his guide, and insinuate his finger within the genital fissure, posteriorly, close to the fourchette.† Having introduced it as high as he conveniently

* In many parts of the continent the women are delivered in the half-sitting, half-recumbent posture. In France they lie on the back, with the thighs extended and the knees drawn up. In other countries they sit upon the knee of an assistant. The peasantry of Ireland place themselves on their hands and knees; and Mr. Michell (on the Ergot) states, that in Cornwall it is difficult to persuade a woman in labour to take any other posture than either standing or on her knees.

† The object of covering the finger with some oily substance before making an examination, is twofold: partly because the lubrication assists its introduction, but partly also to diminish the chance of inoculation with morbid matter, should the patient be labouring under any venereal affection. Three of my intimate medical friends have suffered most severely from secondary

can, he must pronate his wrist so that the junction of the first and second finger shall fit in under the symphysis pubis. (Plate 42, fig. 1.) In this way he will be able usually to reach the os uteri without difficulty. Should that organ, however, be situated so high that he cannot perfectly command it,—rather than remain in ignorance of its condition, and of the presentation of the child,—he may introduce the first two fingers of his *left* hand, (fig. 2); and as these may be passed higher within the pelvis, they will give a greater facility for inquiry.*

These examinations are commonly made during the urgency of pain; and this has given rise to the phrase of “trying a pain.” It is, however, desirable, on many accounts, that we should not introduce our finger up to the os uteri at the time when the uterus is acting strongly; because then the membranes are protruded into the vagina; and if we press against them at that moment, we may probably rupture the cyst, and lose its influence in the after progress of the labour. Besides, it is impossible under such protrusion to ascertain the presenting part of the foetus with precision, because of the quantity of water, which is then interposed between our finger and its person. Nevertheless, as it is expected that we should

symptoms of syphilis communicated in this manner; and five different midwives of the Royal Maternity Charity have been the subjects of the same disease, contracted through an abrasion of the cuticle, while in attendance on women in labour. These are grievous accidents, and no means should be left unused, by which such a serious consequence may be avoided. If, unfortunately, a suspicious looking sore should make its appearance on the finger, all obstetric duties must be abandoned until after it is healed; for another woman may be infected from the contact of an open chancre on the hand of the medical practitioner,

* The two figures in plate 42 show the os uteri in the process of dilatation, and the mode of examination; fig. 1 displays it but slightly opened; fig. 2, when it has acquired a greater diameter.

examine while the uterus is in action,—and, indeed, as in many cases the patient would not allow us to pass our finger at all, were it not for the belief that we can assist her, and that only in the time of pain,—it is necessary that we should request her to inform us when there is a return, and take that opportunity of introducing our finger within the external parts. Having gained this advantage, we must allow it to remain inactive in the vagina while the pain continues; and upon its cessation, which we have seldom any difficulty in ascertaining, we may direct it up to the os uteri.

The condition of that organ with respect to its actual dilatation, and its dilatability, whether the membranous cyst is ruptured or is still entire, the presentation of the child, and the degree of relaxation which the vagina and the perineum have already taken upon themselves, will all become matters of observation during this primary examination.

In regard to the first of these points, it is not always easy for a novice to distinguish the mouth of the womb at the commencement of labour. I have known many students attend a number of cases before they had been able to detect the os uteri by the feel, or satisfy themselves where it was situated. I have before stated that it will generally be met with about two inches or two inches and a half from the vulva, looking back towards the sacrum or coxyx.

Being satisfied that we feel the os uteri, we must next ascertain whether the membranous cyst has broken or not. It is not always easy to determine this point either in the *interval* of uterine contraction; because the membranes being then flaccid, retreat, together with the contained fluid, within the uterus; and there remains merely a thin skin, as it were, between the finger and the presenting part of the child; so slight, indeed, as scarcely to be perceptible to the touch. But as soon as pain re-

turns, the soft wedge, if unbroken, is again felt protruding through the os uteri, and there is then no difficulty in detecting it. If, therefore, we have not been able to learn, in our first examination, whether or not the liquor amnii is evacuated—inasmuch as we have carried our finger up to the os uteri in the *absence* of pain,—we may take the opportunity of examining again when the next contraction comes on; and on passing the index finger up to the pelvic brim while the pain is urgent,—most carefully, lest we should rupture the sac prematurely,—if we distinctly feel them protruding downwards into the vagina, we know that the membranes are still entire.

Again, it is of first importance that we should ascertain what part of the child presents, even before the membranes rupture. The necessity, indeed, of determining the presentation previously to the discharge of the waters, is denied by some obstetricians of great authority.*

With such a dangerous sentiment I can by no means coincide; considering it imperative on every practitioner—provided the labour has made any progress—not to leave the patient's room until he has perfectly satisfied himself that it is the head which offers at the brim: for as occasionally transverse presentations occur—as, under such a malposition, it requires that a change in the situation of the fœtus should be artificially made before the birth can be perfected—and as that change is comparatively an easy operation previously to the bursting of the membranes, but is rendered one of the most difficult in surgery, if much time is allowed to escape after the evacuation of the liquor amnii—so it necessarily follows that the advocates of such a doctrine run the risk of lulling their disciples into a perilous and fatal security. It is certainly not always an easy matter to distinguish the presenting part at the onset of labour, by the first finger

* Blundell's Principles of Obstetricy by Castle, p. 235.

of the *right* hand, because, occasionally, it lies too high for detection in that manner: but it is seldom that some part of the child's body cannot be felt, if two fingers of the *left* hand be introduced into the vagina; since they will almost always command the whole cavity of the pelvis, and may be passed up to the very brim. Whenever, then, any doubt arises as to the position of the foetus, it is much better to have recourse to this second expedient than to remain in ignorance of so material a point.

Discriminating marks of a head presentation.—The head is distinguishable by its large volume, its roundness and firmness, and by its constituent bones being intersected and separated from each other by open lines and spaces: for it is seldom, when the os uteri is dilated to the size of half a crown or a dollar, that we cannot detect some portion of a fontanelle, or one of the sutures. There is little chance of any other presentation being mistaken for the head, except the breech, and perhaps (as I have known happen) the side. The breech is most likely to be confounded with the cranium, because it possesses a larger circumference than any other part of the child's body, except the head; but it still differs from the head materially in its general size, and more particularly in feeling to the finger softer—not so resistant, but more *cushiony*: it is also more pointed, and possesses no structure resembling a suture or fontanelle. The principal discriminating marks of the presence of the breech, however,—of which I shall speak more at length hereafter—are the anus and genitals. The only point of structure in the side that bears the least shadow of resemblance to the head, consists in the interosseous spaces between the ribs; one of which might possibly be mistaken for a cranial suture. If it were worth while drawing distinctive marks between these two parts, I might observe, that at the commence-

ment of labour under a side presentation, the body of the foetus seldom descends upon the brim, or into the pelvic cavity, so readily as when the head offers itself; the shoulder and breech being then supported by, and resting upon, the respective ilia. It is, therefore, generally quite out of the reach of the finger, until after the membranes have broken; and this of itself would be a suspicious circumstance. Secondly, the space between the ribs is wider than any suture of the head—unless, indeed, the foetus be hydrocephalic; and, thirdly, we may usually detect more than one interosseous vacancy. Now, as there are no two sutures in the cranium that run in parallel lines, if we can trace more than one such space by the finger, we can be at no loss to determine that they are both intercostal.

Having ascertained by the marks enumerated that the head presents, we may be content with this information; it is by no means necessary, or desirable, at present, that we should perplex ourselves with endeavouring to make out the nice distinctions between the different parts of the head, so as to say exactly whether the face is directed to one side or the other; or whether the vertex presents, or any other point. It is sufficient that we have assured ourselves the head is at the brim; and we may take it for granted the vertex offers, unless, indeed, we can clearly distinguish the marks of some other part. This recommendation is not given to impress the student with the idea that it is enough to make a careless examination, but to prevent his doing harm by any attempts to inform himself on such a difficult matter—harm by irritating the vagina and os uteri—but especially by prematurely rupturing the membranes, which it is highly necessary to preserve whole. For in irritable habits we shall often find that the most simple examination is sufficient to cause an accession of uterine pain; and if—only in-

tent on ascertaining how the head is situated, without reference to the preservation of the bag—we carry our finger round, within the os uteri, we shall most likely induce action; and the membranes will be more or less suddenly protruded against its extremity. The finger then passes into the centre of the aqueous cyst, the liquor amnii discharges itself, and irreparable mischief is done. Let us then—if we have clearly distinguished the head over the os uteri—presume that it is placed in the most favourable position for its descent into the cavity of the pelvis, until the membranes have given away. We may after that proceed to examine the presenting part more accurately; and, provided the labour does not progress favourably and satisfactorily, we must take pains, in all cases, to learn whether the delay be owing to the malposition of the head; or to some other of the many and various causes that may retard its advance.

When the first examination has been made, the patient herself, and her friends, are always anxious to learn from the medical attendant if all be natural and satisfactory, and how long is likely to elapse before the labour will be terminated. With regard to the first question, if we have gained all the information which I require we should do, we may give a decided answer; but the second must be evaded. If we find the vagina distensible, the os uteri dilated, the head presenting, and the pains sufficiently active; we may reply, with a positive assurance, that so far everything is favourable; that no case can afford a more auspicious promise than the one under our care; and that, therefore, we are warranted in anticipating a fortunate result: to the second question, let us not attempt to reply. Let us take it for granted, after such a positive declaration of good tidings, that *it* will not be repeated; and, as society is at present constituted, whoever obtains a plain, straight-forward answer to one out

of two questions, ought to consider himself fairly dealt with. But if the party we are addressing thinks differently,—which we shall most usually find the case,—and presses the subject again on our attention, let us tell them plainly, they ought to remain content with the honest declaration we have given, that the case is progressing as favourably as possible; that it is out of the scope of human knowledge, and consequently quite out of the power of any human being, to say positively when the labour will be terminated. Any opinion we might form would be but a guess at the best; and it is not fit that we should trust an answer, which may involve such serious disappointment, to conjecture. If we were to make a promise, that the labour would be brought to a close either at noon or midnight, or any other specified moment, we may be disappointed in two ways. It is very unlikely that it should end just at the period of time we have mentioned; it might be earlier, and then an inference might be drawn, that we knew nothing about the case: but it is also probable, that the time fixed upon will pass by, without our promise being fulfilled; it will then act most injuriously on the patient's mind; she loses confidence,—that loss of confidence is attended with dejection,—the nervous system is depressed,—and the process of labour is more or less interfered with. By making promises of this kind, indeed, we may be the means of producing a lingering, painful, dangerous, an instrumental, and perhaps a fatal case. Upon such trifles, sometimes, does the welfare of our patient depend!

*Frequent examinations should not be made during the first stage of labour:—*we can do no good by such a practice, after we have once gained the information we require; we cannot facilitate the descent of the child; we cannot dilate the parts; but we may do a great deal of

injury ; for we denude the vagina of that soft relaxing mucus which is designed by nature to protect it, and we moreover run the risk of destroying the integrity of the membranous cyst : we may, therefore, predispose the parts to inflammation, and retard the dilatation of the os uteri itself. As, however, it is a common idea among women, that, under each examination, material assistance is rendered, we shall frequently be urged, during the first stage,—especially if the labour be rather slower than usual,—to remain in close attendance on the patient's person ; and these solicitations are generally advanced with a degree of fervency that it appears the extreme of cruelty not to accede to. Should this be the case, the finger may be introduced from time to time, with the greatest care and gentleness ; more to pacify the patient's mind, and assure her she is not neglected, than with any other view beyond that of merely watching the progress of dilatation. The more rigid the parts are, the more do they require the softening influence of the natural secretion, and the more careful must we be to preserve it.

A question naturally arises, whether we shall remain in the bed-room, or may with safety return home. It is not right that we should stay in the same chamber with the patient, during the first stage ; because there is a frequent inclination to pass urine and fæces ; and she will be compelled to restrain that desire, as she will probably not like to be constantly requesting her medical attendant to retire. It is not necessary for us to remain with her ; all that is required being, that we should overlook the process, and be at hand to act on any emergency occurring. We may retire, then, from the room, and direct the nurse to inform us, if the pains become stronger, and particularly if the membranes rupture. In about an hour—should we receive no summons

in the mean time—we may see her again, and may then, if we think it right, make another examination, to ascertain that the labour is proceeding satisfactorily. But, if it is not necessary for us to continue in the chamber, or by the bed-side, is it desirable for us to return home? In this question, the comfort and convenience of the medical attendant are much interested; and its answer must depend, in a great measure, on circumstances;—such as, whether it is a first or subsequent labour; whether the previous labours have been quick or lingering; how far the os uteri is dilated or dilatable, and particularly the distance of her residence. If it should not be above a few minutes' walk from one house to another, it is not necessary that we should stay at the commencement of labour; but if the distance be great,—especially if the patient have had children before, and her labours have been quick,—even should the os uteri not be dilated more than to admit the point of one finger; provided the pains are following each other rapidly, it is better not to leave the house. As a general principle, I would advise, that in all cases, as soon as the os uteri has acquired the diameter of half-a-crown, sufficiently large to admit the points of four fingers just within its disc, the attendant should not be absent from the house for more than a quarter of an hour or twenty minutes at a time; because, although it may have taken five or six hours to dilate from a close state to that dimension, the subsequent process of dilatation may go on so rapidly, that a few more pains may accomplish the delivery; and that before he can arrive.

Some practitioners recommend, that, although our presence is not required in the lying-in chamber, still we should not occupy ourselves in any employment or amusement, while we remain in attendance. They argue, that, inasmuch as we receive a consideration for our time and service, our whole mind should be entirely devoted

to the woman's safety, and in suggestions for her comfort. With this sentiment I entirely disagree. I grant that we ought to afford every necessary and proper attention, whether we are remunerated or not; but, in common cases, such an entire devotion of our mental faculties is not required; and we may produce a hurtful impression by our apparent anxiety. It is natural for a man, who is not of an indolent disposition, but whose mind is usually directed to some object, to become *fidgety*, if his attention be not occupied by any pursuit; he will, perhaps, be pacing the drawing-room, where the husband is sitting; and by a mere absence of manner, which he can scarcely disguise, he will convey an idea that he is more than ordinarily anxious on account of the lady. Such an impression will find its way through the crevice of the door to the lying-in chamber; it will reach the invalid herself, and is likely to produce all the disadvantages which result from depressed spirits. Let him occupy himself, then, in some way that best suits his taste, either writing or reading; and there are few books he may chance to take up but will afford him both amusement and instruction.

It is by no means requisite that the patient should continue in one posture during the first stage; she may relieve herself by changing her mode of lying, by sitting up, or walking about the room; for she will soon be able neither to sit, stand, nor walk, but will be compelled to take a definite position on the bed, from which, in ordinary cases, she is not to move till after the termination of the labour.

She may be allowed any bland, fluid nourishment, that she fancies; but it is very little she requires. The attendants about her are usually solicitous that she should take sustaining, or perhaps stimulating, substances. But these must be forbidden: the process of digestion does

not go on under labour with sufficient energy to assimilate solid animal food ; and anything likely to excite the circulation would have a tendency to induce fever. A little beef-tea may be taken ; but farinaceous preparations, or tea, or coffee, are much better ; and we shall generally find that, inasmuch as the digestive process is almost suspended under labour, so there is very little desire for nourishment ; and what is swallowed beyond the simplest fluids, is more in compliance with the entreaties of her officious friends, than from any appetite or inclination of her own.

DUTIES DURING THE SECOND STAGE.—The second stage of labour having commenced, we are summoned to the patient's bed-room, if we have been absent, and told that the "waters have broken." She is most likely found reclining on the bed, and probably the pains are more urgent than they were before, or perhaps they are somewhat suspended. We now require to make another examination, because it is possible that the head may have fully entered the cavity, and may be soon expelled. Finding it low in the pelvis—finding the os uteri almost entirely dilated, the membranes broken, and the pains strong, and coming on frequently, it is right not to leave the room ; but unless the perineum be somewhat on the stretch, it is not necessary for us yet to take our post exactly by the bed-side.

But as soon as the head has come to press upon the external parts,—particularly when it has made its turn, and is beginning to extend the structures at the outlet of the pelvis,—it becomes our duty to take our seat by the bed-side, and never to move from our position till the child has passed. This we do to protect the perineum, in order to prevent laceration.

For the purpose of supporting the perineum we sit rather behind the patient, and apply the palm of the left hand—

guarded for the sake of delicacy, cleanliness, and convenience, with a soft napkin—steadily and firmly against the perineal tumor.

To give the required protection, it is not necessary that we should make powerful pressure, nor resist the child's exit by the employment of any exertion; we are only to afford a passive support. Placing our elbow on the bedstead, we render it a fixed point, and rather allow the head, covered by the thinned structures, to be protruded against our hand, than forcibly press our hand up against the head. This part of the duty of the obstetrical attendant is sometimes exceedingly fatiguing. We may occasionally be compelled to remain many hours by the side of the bed, without moving from our seat. It is not to be wondered at that, under such an irksome posture, the hand should become numbed, and the whole body cramped; but we must put our personal inconvenience quite out of the account, when weighed against our patient's safety; and we must recollect, that the more rigid the parts are, the longer time they take in dilating, the more our assistance is necessary. We must not permit any length of time that we may have been so fatiguingly occupied, to rise as an excuse for relaxing in this duty; but always bear in mind, that if the uterus act strongly, and the head be protruded suddenly, while the parts have not the advantage of the support we can afford, there is great danger that such a degree of laceration may occur, as will perhaps render the woman miserable for the rest of her existence.

Most women remain tolerably quiet, in one position, during the second stage of labour; but some are exceedingly irritable, tossing about in all directions, will not be advised, and can scarcely be restrained. It is our duty by all the means in our power, both of persuasion and gentle force, to prevent such a patient injuring herself

by suddenly starting away from our protection; for many cases have happened where a rupture of the perineum, under such circumstances, has occurred, to a frightful extent: and, by a little management, we may generally succeed in confining her sufficiently. I have already mentioned, that the thighs must be drawn up towards the abdomen, and the legs bent a little back upon the thighs, the whole person lying on the left side; and the patient is usually placed so that her feet may rest against the bed-post; and in this way they become a fixed point, and keep the pelvis steady. We render the shoulders, also, another fixed point, so as to steady the upper part of the body, by tying a long napkin, or a round towel, to the same bed-post, and desiring her to hold it in her hand. We tell her, when the pain comes on, to press with her feet against the bed-post, and pull gently at the towel, cautioning her against straining violently. The consequence is, she so fixes her person as to render it almost impossible for her to jump away suddenly, or to recede to any distance from us. Independently of this little manœuvring—when the head is in any degree extending the vulva—the nurse must be required to raise the right knee to some distance from the other, by which means the thighs are separated, and an increased facility given to the exit of the head through the external parts, as well as some control exercised over her movements.

It is very possible that the nurse may wish to substitute a pillow for her own services, and persuade us it will do equally as well. For four reasons the pillow must be objected to: it increases the heat of the person, already, perhaps, profusely perspiring; it does not afford a support sufficient to prevent the legs from being squeezed together; in the acme of pain it will often slip away from between the knees, and we lose its advantage

just when we require it the most; and, lastly, it can be of no service in restraining the woman in one posture.

The extent of injury to which the perineum is liable varies much in degree, from a simple laceration of one or two fibres at the anterior edge, to a rupture of the whole organ, the destruction of the sphincter ani, and the conversion of the two canals, the vagina and rectum, into one common cavity. The rent generally commences at the fourchette: at other times it will begin in some portion of the inner membrane of the vagina, and extend anteriorly to the edge of the perineum, when it will be again continued back through the integuments to the point corresponding with the origin of the laceration within, or will even pass beyond it; and more rarely the head is protruded through the substance of the perineum itself, forming a fresh aperture, by which it escapes, leaving the fourchette entire. Of this latter variety I have only seen one instance; and on that case my opinion was requested in consultation, a few days after the labour. It was evident there, that the child had not passed through the vulva, but through an adventitious opening, between the anus and genital fissure, and the attendant was perfectly aware of that circumstance at the time.*

Varying much in time, varying much in the intensity of agony which is suffered, and in the number of pains that occur, the head is at last protruded, in the manner before noticed. It is most likely the child may attempt to gasp the moment the head is expelled; and on this account it is right to wipe its face immediately with a clean napkin, (of which necessary articles we always require to have a store close at hand,) lest in the first in-

* For a case of this kind see Merriman's Synopsis of Difficult Parturition, p. 240. See also Denman's Introduction to Midwifery, chap. ii. sect. 7.

spiration some of the mucus which may hang about its lips, or other moisture, should be inhaled.

Coiling of the funis around the neck.—I have already mentioned, that some little time usually elapses between the expulsion of the head and the pain that is to expel the shoulders; and this interval may be usefully employed, after the face is cleaned, in making an examination of the neck, to ascertain whether a fold of funis may not possibly be surrounding it, (pl. 41.) It frequently happens that there is one; sometimes there are two, and occasionally three or four folds of the navel-string coiled around the neck; and if it were not liberated, it is very possible that the pain which expels the shoulders might cause the placenta to be dragged away from its attachment, to the great peril of the mother, from hæmorrhage, or perhaps from inversion of the uterus. But the chief danger is to the infant. If on its expulsion the cord be drawn tightly around its neck, the circulation through the funis will be arrested by the compression of the vessels; and the same compression may also close the trachea to such an extent, as to prevent the ingress of air into the lungs. Thus the two sources by which life is maintained being cut off at the same time, strangulation must be a necessary consequence. I was once witness to the death of an infant under such circumstances. When I arrived at the patient's house, I found the child lying dead near the external parts of the mother. The funis umbilicalis was twice coiled round the neck, and the child had been deprived of the advantage of the placental circulation, and of the power of breathing at the same time, and by the same means. There was a deep livid ring encircling the throat, produced by the pressure the funis had caused; and it was evident from this mark that the infant was alive at the moment of its birth. It is a most interesting and instructive case, not only obstetrically

and physiologically, but particularly with respect to forensic medicine. If this birth had taken place under suspicious circumstances, and the mother had not been a married woman, it is very possible that a charge of murder might have been founded on the appearance of the mark round the neck; as it could not be distinguished from the effects of a cord, applied with the intention of destroying life.

The best way to free the funis from this awkward situation is by drawing down the loop, and passing it over the child's head, by which means we liberate it entirely, and it is no longer an impediment to the expulsion of the shoulders. But it occasionally happens,—especially if the funis be more than once coiled round the neck,—that it is not sufficiently long to allow its being pulled over the head: we may then keep the loop distended with our fingers, until the shoulders are expelled, and they must be allowed to slip through it. In some cases it is not possible to carry into effect either of these modes of liberating the child; and it may be necessary to cut the funis before applying a ligature. Under such a proceeding we must be careful to prevent bleeding from the umbilical arteries.

Directly the head is born, it is usual for some one of the attendants to offer to the medical practitioner a close flannel cap for the infant, which he is expected to apply as soon as a convenient opportunity occurs; and this is done under the idea that, of all parts of the body, the head is most susceptible of the action of cold. As far as I know, there is no good ground for this assumption; but inasmuch as the custom is dictated by a very universal prejudice, it is as well to give way to it, unless other more important duties require immediate attention: for should this very necessary precaution, as it is supposed, be omitted, and the proffered means of protection be re-

jected with indifference or scorn, it is more than probable that any little ailments the child may be subject to during the first few weeks of its extra-uterine existence, will be attributed to the neglect shown in this particular.

Support of the perineum during the expulsion of the body.—Although the shoulders of the child take up less room than the head, and although the parts, having been previously distended by the passage of the larger substance, generally easily admit the shoulders—provided the child be of normal shape—still it is desirable that support should also be afforded to the perineum while the body is being protruded, even after the head has made its exit. Having wiped the face, and made an examination to ascertain that the funis is not twisted around the neck, we may again place the left hand on the perineum, while we direct the foetal body rather forwards, — in correspondence with the axis of the pelvic outlet, — and receive it with the right.

It used to be the custom to surround the neck with the thumbs and fingers of both hands, and forcibly extract the body the moment the head was in the world, for the purpose of liberating the woman from pain, and terminating the delivery as speedily as possible. Such practice is attended with double danger ;—great chance of injury to the child, by the tension of the neck ; and no small probability of hazard to the mother, by the uterus being prematurely emptied. It is thus left in a flaccid state : the stimulus which previously disposed it to contract is suddenly taken away ; that disposition ceases, or is suspended ; hæmorrhage is induced ; a necessity probably arises for the artificial removal of the placenta ; and incalculable mischief is the consequence. Those persons who commend such meddling interference, and who estimate the skill of the obstetrical attendant by the

rapidity with which he can extract the body after the head is born, found their eulogium on most dangerous premises.

When the shoulders have passed, the parts require no further protection ; the breech and legs are generally soon expelled, with slight suffering, and little hazard to the maternal structures.

The child, then, being entirely in the world, it must be slowly removed a little distance from the mother's body, not more than to the extent of four or five inches, and withdrawn from beneath the bed-clothes, the woman's person being still left perfectly covered and concealed. It has been already shown that the funis umbilicalis varies exceedingly in length, and that sometimes its measure has been known not to exceed half a foot. Now, should the cord be unusually short, and should we hastily draw away the infant to some extent, we shall *make a pluck* at the placenta ; and we run the risk of tearing it away from its attachment, or, perhaps, of even inverting the uterus. If we find the cord sufficiently long to permit the further removal of the child's body, we may place it more completely under our command ; and after having lifted the bed-clothes from above it, so as to bring its person completely into view, we may proceed to secure the vessels, and separate it from the mother.

The ligatures commonly employed in London consist of eight or ten pieces of thread, a skein of which is placed in readiness for our use. A sufficient number having been selected to form the proper thickness, a knot must be tied at each end ; and this preparation should be made before the child is born. Even in forming the ligature some attention is requisite ; if it be too thick, it will not compress the arteries sufficiently to prevent bleeding after the funis is cut ; and it is also liable to lose its hold, and slip altogether off the cord, thus leaving the vessels

perfectly unprotected : and if, on the contrary, it is too thin,—consisting only of two or three threads,—it will probably cut through the membranes covering the cord, as well as the coats of the vessels themselves, and cause in this manner a loss of blood. It is also necessary that the threads should be all of equal length ; for if one or two be shorter than the rest, they alone will make compression ; and consequently they will act, as though the ligature were composed of them only.

Two of these ligatures at least must be prepared : one is to be applied about three fingers' breadth—two inches—from the child's navel, must be drawn tight, and strongly secured by a double knot. A second must be placed nearer the placenta, at about the same distance from the first, that the first is from the body of the infant ; and a double knot made as before : the funis is then to be divided between them.* It is as well, previously to tying this second ligature, to squeeze as much of the blood as we can out of the space intervening between the two up towards the placenta, lest, at the moment the division is made, some should be projected on our dress.

The object of the second ligature is twofold—cleanliness and safety : if the cord were cut beyond the first ligature, without securing the placental end, the blood contained in the umbilical vein and placental vessels would be squeezed out, and run upon the floor, or on our own clothes. But especially is this addition to be used as a precaution against the possibility of danger : for if

* Smellie, (vol. i. p. 196,) Baudelocque, (parag. 848,) and Dewees, (parag. 485,) recommend the employment of one ligature only, near the body of the child ; and the reason assigned is, that the escape of blood from the open vessels of that portion of the funis left attached to the placenta, by diminishing the bulk of that mass, facilitates its expulsion. This practice rests upon erroneous premises, as the placenta is equally well thrown off, whether its vessels are allowed to bleed or not.

the gestation had been double, and if (which is a very rare occurrence) the circulations of the two children anastomosed in the placenta common to both their systems, so that the blood of each circulated in the body of the other reciprocally, it is possible that the unborn child might bleed to death through the divided funis of the one already in the world; provided the end of the cut vessels were left unprotected. We need not fear that the woman would lose any blood from her system through the open vessels of the cord, even although the placenta remained attached to the uterine surface; because there is no direct vascular communication between the uterine arteries and the umbilical vein.

There is danger in placing the first ligature close to the body of the child, lest we should include a portion of intestines protruded through the open umbilicus into the cord—an occurrence by no means rare—and lest the compress should not be tight enough to prevent hæmorrhage, in which case we have no space left to apply another ligature upon; and there is danger also in dividing the funis too near the first made ligature, lest it should slip away from its hold, and the vessels be no longer secured.*

The funis must be divided by a pair of blunt-pointed scissors, to prevent the possibility of the infant being injured by the extremities of the blades. For the purpose of protecting it further also, the thumb and third finger of the left hand must embrace one portion of the funis,—being placed over the ligature which is nearest to the

* There was an absurd notion formerly prevalent in relation to the length of that portion of the funis left attached to the child's body on its division, (see Dionis's Midwifery, English translation, p. 298,) which is commented on by Dr. Graaf, (Amstelæd : 1705, p. 72,) in the following words:—"Ineptum est illud obstetricum figmentum futurum penem majorem, si vasa umbilicalia non proximè ad umbilicum ligentur."

child's body,—while the other ligature is held between the first and second finger of the same hand; and the section must be made between them by one cut. If one portion of the funis only be held, and that carelessly, while the division is being made, it is by no means impossible that one or more of the child's fingers or toes might be taken off at the same time, as in the case recorded by Merriman;* or the penis even might be amputated, as occurred in an instance that came under Denman's observation, and which he used to detail in his lectures.† It will be impossible for an accident of this disastrous kind to happen, if we protect the child's body as just recommended; for should it throw a limb into the very jaws of the scissors at the moment we are about to close them, we shall feel the stroke upon our hand, and become conscious of the chance of injury.

Generally the infant cries strongly as soon as it is born, and in such case the ligatures may be applied immediately. It was once the custom to tie the funis directly the child was in the world, whether breathing had commenced or not; under such management, no doubt, many were lost. Hippocrates,‡ speaking of a foetus that has passed with difficulty, or been extracted by art, counsels us not to separate it from the mother until it had either passed urine, sneezed, or cried aloud; or, in other words, until strong assurance was afforded of its having assumed some of the functions belonging to breathing life. Denman§ recommends that we should not put a ligature on the funis until after the circulation

* Synopsis of Difficult Parturition, p. 21. Here one joint of the little finger was included in the ligature and cut off.

† See Introduction to Midwifery, chap. viii. sect. 9, where the case is hinted at, though not detailed.

‡ De Superfœtatione, caput 5. I do not quote Hippocrates as an obstetrical authority; but his remark is valuable, as shewing the practice of his time.

§ Chap. ix. sect. 9.

through the umbilical vessels has ceased. Of these instructions, that by Hippocrates is by far the best. There is no necessity to wait until the umbilical vessels have ceased to pulsate; because the same changes will take place in the arterial system of the child, whether the circulation in the funis is interrupted rapidly, or whether it occurs more slowly, and by degrees; and the infant can derive no benefit from a continuance of the circulation through the cord after it has breathed freely, nor indeed after the placenta is separated from its uterine attachment. Denman tells us, "in the course of ten or twenty minutes, or sometimes longer," the pulsation in the funis has entirely ceased. I am inclined to think it would generally be much longer; but this is mere speculation, as I have no experience on the subject; for I never delay the application of the ligature until the pulsation has ceased spontaneously. It appears to me, indeed, by such a practice we should be unnecessarily keeping the child in a very awkward, not to say dangerous situation, and subjecting the mother also to considerable additional inconvenience. The rule I would lay down for the guidance of the student is nearly that directed by Hippocrates. I would recommend him not to put the ligature around the funis until the child has cried, or given some other unequivocal evidence of the proper change having taken place in the function of the lungs; unless indeed it be born with animation suspended, and he is desirous of using the warm bath, inflation of the lungs, and other resuscitating means, as speedily as possible.

On the child being separated, it must be handed to a careful attendant; and we must be watchful that its mouth and nostrils are not so covered as to impede the ingress of air into its lungs, an accident not unlikely to happen from the too zealous attention of its new protectress to prevent its taking cold.

The infant being carefully disposed of, we must pass our hand upon the patient's abdomen, before we leave our seat, for the purpose of ascertaining whether there be a second child or not; and whether the placenta is still retained within the uterus, or has escaped into the vaginal cavity.

If the uterus contain another foetus, its fundus will be felt high up, above the umbilicus, and its general bulk will be almost as great as it was before the expulsion of the first. We shall be able to define it distinctly; it will present that peculiar elasticity, and that degree of subdued fluctuation, which are so characteristic of the gravid uterus towards the close of pregnancy. But if there is no other child in the cavity, we may find the womb in one of the following five conditions. First, it may be almost as small and hard as a foetal head, so that we can grasp its body completely; and it feels nearly as solid as a cricket-ball. Secondly, it may be almost equally small, but softer; so that when we press it, it *gives* under our hand, and has somewhat of a doughy feel. Thirdly, it may be about the same size, but one minute hard and the next soft. Fourthly, it may be almost as large as an adult head, and so hard that we can perfectly define it with the hand; it bears the character of a large, solid tumor. And, fifthly, it may be as large as an adult head, and soft, its general volume not so easily defined, also communicating a doughy sensation to the touch; and when grasped, it becomes harder in substance, and less in bulk.

The three first states announce that the placenta has wholly, or almost wholly, passed into the vaginal cavity, and the two last indicate that it is still in utero; the fourth proves that the uterus is contracted around the mass, and the fifth shows that it has not yet taken on itself the office of contraction, for the purpose of expelling it. Of

all these conditions immediately after the child is disposed of, we generally find the last the most prevalent—namely, where the uterus has not yet contracted to expel it; but where we may expect that in a few minutes action will be re-established, under which it will be protruded into the vagina. The woman cannot be considered in a secure state so long as the placenta is retained in the uterus; nor is she to be looked upon as positively safe from hæmorrhage, unless the first of these varieties obtain,—unless the uterus is as small as a foetal head, and so hard that we can make no impression upon it by our grasp. We may then conclude that the placenta is entirely excluded, and that she is free from the danger of flooding, at any rate for the present: but this state of perfect contraction is seldom met with so soon after the child's birth.

After having examined the uterus through the parietes of the abdomen, we must make an internal examination, more perfectly to assure ourselves in what way the placenta is disposed of. Twisting the funis umbilicalis around the first two fingers of the left hand, and bringing it to its bearing, we pass the first finger of the right hand, previously anointed, into the vagina, as in a common examination. If the placenta be entirely in utero, which, as just remarked, is most commonly the case immediately after the child's expulsion, we shall either not be capable of touching it at all, or if it be within reach, we shall only be able to detect a very small portion of it; we may just feel it offering itself at the os uteri, but we cannot surround its volume, nor can we probably discover the insertion of the funis.

Removal of the placenta.—There is no part of natural labour which requires so much judgment as the conduct of the third stage; for the slightest mismanagement of the placenta may be productive of most serious mischief,

by converting a perfectly natural into a most dangerous and complicated case. As long, then, as the placenta remains in utero, so long we must wait, within a certain limit,—provided there be no flooding,—for those contractions which are to expel it from the uterus into the vaginal cavity. The length of time which it is desirable to wait will be particularly specified when the undue retention of this mass is treated of.

Before quitting our post at the patient's bedside, her person must be made as comfortable as circumstances will permit, by the removal of all the wet and soiled napkins, and the application of two or three others, warm and dry, to the hips and vulva. We need not be solicitous about getting the placenta away soon; all pulling or jerking at the funis with this intent must be avoided; but while it remains out of the reach of the finger, provided there be no return of pain, some gentle grasping pressure may be made on the uterine tumor; this will facilitate contraction, and perhaps expedite the expulsion of the mass. The amount of pressure must not be such as to give pain, but only a comfortable support and a sensation of security. Having withdrawn from the bedside, and paid some little regard to the arrangement of our own dress, we may offer some words of consolation and congratulation to the patient; make our observations on the pulse; and request another blanket may be thrown over her, to prevent any rigor or chilly feeling supervening on the violent perspiration she has suffered.

In some countries, and in parts of this kingdom, it is the custom to give the patient a tolerably strong stimulant or cordial, consisting of a glass of warm wine or spirit and water, immediately after the child's birth;* but in London this practice is not generally followed; and I think we act more safely in omitting it, unless faintness

* Campbell's Mid. p. 198.

or some other cause indicates the necessity. Any mucilaginous or diluent drink may be exhibited, if she be inclined to take it—not warmer, however, than the temperature of the body;—and we may assure her, unless there be any contra-indicating system, that so far she is safe for the present.

The nurse should be required to devote herself entirely to her mistress until after the placenta has passed, because her services may be necessary; the child need not as yet engage any part of her attention. We may employ ourselves in the patient's room for five or ten minutes, if we choose, or we may withdraw into another; but we must on no account leave the house so long as the after-birth is unexpelled; and we must not be many minutes together absent from her side, lest a sudden attack of hæmorrhage should occur, and only be detected on the supervention of syncope. Our time may be advantageously occupied in looking to the child's safety, and particularly in assuring ourselves of the security of the umbilical vessels.

While we are thus watching, we shall most likely be informed of the return of uterine action, by the woman complaining of two or three comparatively trifling pains affecting the back and loins. As it is probable that under these pains the placenta may have somewhat descended, another examination may then be made *per vaginam* to satisfy ourselves on this point. Our subsequent conduct must be regulated entirely by the situation in which the placenta may be found. I have already said, that so long as the mass remains perfectly out of the reach of the finger, so long it is completely included within the uterus, and so long no attempt must be made to remove it by traction at the funis. But although we may be positive, if we cannot feel it, that it has not yet descended into the vaginal cavity, we cannot be equally certain, when we detect a portion of it, that it is wholly excluded from the

uterus ; because part of the edge may appear externally to the os uteri, while the great mass remains within. Neither must we feel satisfied that it is lying loose in the vagina, even although we may be able to distinguish the insertion of the funis easily, as is generally taught and believed, because the placenta may be of a battledore formation ; (Plate 26, fig. 1 ;) and although the root of the cord may be quite within reach, and the division of its vessels perfectly and clearly discernible, yet the principal bulk may be still in utero, and perhaps morbidly adherent to the uterine surface ; under which state, if we were to make any forcible attempts to remove it by pulling at the cord, we must necessarily and inevitably produce mischief, and should probably place our patient's life in imminent hazard.

Before we can assure ourselves that the placenta is totally excluded from the uterine, and resting in the vaginal cavity, we must be able not only to feel its substance distinctly,—not only clearly to detect the insertion of the cord into its structure, but we must also be able to surround it entirely by the finger, so as to encompass its principal bulk. It may then be withdrawn at pleasure by simple traction at the cord. Should it be found requisite, however, to remove it from the uterus, the agency of the funis must by no means be relied on ; but the hand must be introduced completely within the womb, and it must be extracted in the manner to be hereafter particularly detailed.

By some, indeed, we are recommended not to withdraw the placenta even from the vagina, but to wait for its natural extrusion by the muscular powers of that organ,* under the belief that its continued residence in the canal will stimulate the uterus to more perfect and

* See Denman, 4to edit. p. 271.

complete contraction, and thereby further the prevention of hæmorrhage. I can neither coincide with this sentiment, nor agree with the practice; because, as already shown, the vagina having been inordinately distended by the head of the child, its fibres will sometimes not recover sufficient tone to contract effectually on the mass for some hours. During this time the patient's mind is kept in a state of great anxiety, inducing perhaps serious distress; since all women are well aware that they cannot be pronounced safe until, at any rate, the after-birth has come away. Again, so far from considering the continuance of the placenta in the vaginal cavity likely to prevent an immoderate loss of blood, I cannot help thinking that its tendency would be exactly the reverse; for, should more blood than is usual be poured out by the uterine vessels, provided the vagina be free and unoccupied, it will escape externally, give an opportunity for the uterus to contract, and its flow will be both evident to the woman's sensations, and perceptible to the attendants, on an inquiry being instituted: sufficient time will, therefore, be afforded for employing means to insure perfect and permanent contraction of the organ. If, on the contrary, the same disposition existed, while the placenta occupied the vagina, by filling up the cavity it would act as a plug, prevent the escape of blood externally, and cause an accumulation in the uterus: that accumulation will distend the uterine parietes; and, in the same degree as this distension takes place, will the vessels be enlarged, and their apertures opened. They will, therefore, be pouring out their contained blood in a geometrically increasing ratio, in proportion as the volume of the uterus becomes expanded. A greater quantity of blood is thus lost in a shorter space of time, and the effect is consequently the more dangerous. Besides, the blood

being pent up within the uterine cavity, there is no external evidence of the danger that is stealing onward ; and the patient might possibly flood to death before it was even discovered that bleeding was going on.

No harm can arise from withdrawing the placenta carefully from the vagina by gentle traction at the cord, when it is entirely under the command of the finger, introduced as before recommended ; but the greatest possible hazard may be incurred by attempts to bring it away in the same manner, before the mass can be clearly, distinctly, and perceptibly defined.

The removal of the placenta from the vagina is very easily effected. Twisting the funis umbilicalis two or three times around the first and second finger of the right hand, we draw down in a line tending towards the coccyx, and receive it in the left, placed under the perineum ; or we may introduce the two fingers and the thumb of the left into the vagina, embrace the mass between them, squeeze it as we would a sponge, and slowly extract it.

It is not only necessary that we should remove the placenta, but the whole of the membranes also, if possible. Some practitioners are careless about the membranes, their whole attention being directed to getting away the placenta ; but unless some management be used, the delicate foetal involucra are often torn—pieces are left in the uterus, giving rise to many evils—the least of which, perhaps, is the alarm likely to be created by a portion being protruded through the external parts in the shape of a thread, or offering itself across the vulva, like a smooth glistening tumor, retaining behind it a quantity of fluid and coagulated blood, some hours after the termination of the labour.

Another distressing evil likely to arise from the same cause, is the accession of violent after-pains, induced by the

irritation that the presence of a portion of the membranes occasions; and a third, still more dangerous, is fever of a typhoid type, originating in the absorption of the fluids which are entangled within their folds, and which in time become putrid. All these serious inconveniences may be prevented by a careful removal of the membranes.

To obviate the chance of their being torn, some recommend that, as soon as the placenta has passed through the os externum, it should be twisted round two or three times, in such a manner as to bring them away like a cord.* This is scarcely necessary; all that is required being, that we should draw them forth slowly; or carefully work them out with our fingers, if there be any difficulty in their extraction.

The placenta and membranes being perfectly freed, we require a basin or some other receptacle to deposit them in, which, for the sake of decency, we cover with a cloth, and again apply the hand over the uterine tumor, to ascertain that the organ is still in a contracted state, and that no bleeding is going on into its cavity. Having perfectly satisfied ourselves on this point, we may a second time take away the napkins soiled with the accumulated discharges, and envelop the lower part of the patient's person in others that are warm and dry. Three will be sufficient: one must be partially slid under the left hip; another may be placed over and around the right hip; and a third carried between the thighs, directly on the vulva. After the patient has been thus made as comfortable as circumstances admit of, the state of the uterus must be again inquired into, by the hand externally applied, before we withdraw from the chamber; and if no relaxation in its parietes has occurred, no increase in its volume, nor any distension of its cavity,—while, at the same time, there is but little sanguineous

* Campbell's System of Midwifery, p. 202. Dewees' Mid. par. 486.

discharge externally,—we may pronounce her safe for the present from the chance of hæmorrhage; and, if other symptoms correspond, in as favourable a state as could be hoped for.

AFTER TREATMENT.—*Medicine*.—It is the custom of some practitioners to give a large dose of laudanum immediately after delivery, to quiet the system, to lull the excitement, to still the after-pains, and to procure sleep.* I hold this practice as a principle to be even more injurious than the exhibition of large doses of stimuli, because, besides acting as a strong stimulus for the moment, opium exerts a powerful narcotic effect afterwards; and by this effect, it must interfere with those proper and indispensable contractions which the uterus is taking on itself. It is true we can relieve the patient from the annoyance of after-pains; but at the same time that we remove the pain, we are incurring danger; we are cramping nature, by depriving her of the only power she possesses for insuring the woman's continued safety. The same objections, indeed, do not apply to opiates in a small quantity; they are, in minute doses, likely to do good rather than injury, because they may soothe irritability without interfering with the necessary changes going on in the uterine system. If, then, we can give such doses of opium, and repeat them at such intervals, as will just induce a state of gentle quietude, and yet not suspend the uterine contractions, we shall be rendering the best service in our power. It appears to me, that by the exhibition of four, five, or six minims of laudanum, or a corresponding quantity of any other sedative drug, repeated every four or six hours, we shall be most likely to effect this object. The opiate may be added to a saline draught, containing three or four drachms of the liquor ammoniæ acetæ, with a

* See Blundell's *Obstetricy*, by Castle, p. 729; Ryan's *Manual*, 1828, p. 251; Dewees, par. 494.

little camphor mixture, or given in any other suitable vehicle.*

Before the house is left, it is right to make another examination of the uterus, through the parietes of the abdomen, to ascertain that it has not become relaxed since the hand was last applied ; the napkins, also, round the hips and on the vulva, must be again inspected, that we may assure ourselves no external hæmorrhage is going on. If, upon this examination, we find that the uterus is still as small, and almost as hard as a foetal head—if the linen be but little soiled—if not more than two or three coagula, the size of a nut, have passed—we need be under no alarm with regard to the state of the patient ; so far as hæmorrhage is concerned, she is safe, most probably, for that labour ; at any rate for the present moment. If, on the contrary, we observe a considerable discharge of blood upon the bed, if the uterus be large, soft, and flaccid ; or if, on pressure being employed, a coagulum escapes, or a quantity of fluid blood passes, with a gurgling noise, she is then flooding ; she must not be left, but will require careful superintendence, probably for many hours.

* Medicine of any kind may often not be required after delivery ; but in many cases it is useful ; and in few can even opium do harm, if exhibited in small quantities, unless there exist a peculiar idiosyncrasy of constitution unfavourable to its action. It is as well, then, that something should be ordered ;—not simply because it is expected ;—not merely because the patient may consider herself neglected if it be omitted, and may attribute any inconvenience she may afterwards suffer to that omission ;—but because it tends to keep down excitement, and to induce repose. The old-fashioned spermaceti draught used to be a favourite medicine after labour. It was administered under the idea that spermaceti was a specific for inward contusions, and that under labour the neck and mouth of the uterus, and the vagina, were necessarily bruised by the passage of the child. Both the positions, however, on which this practice was founded, are erroneous ; neither is spermaceti a specific for inward bruises, nor is it usual for any inward bruising to take place under labour. But spermaceti forms an elegant draught, and is a harmless drug, and there exists no objection that I am aware of to its exhibition.

Presuming, however, that the case is of the more common kind—one in which the uterus is small and contracted, in which there is a slight discharge from the external parts,—the napkins being but partially soaked,—and in which the feelings are comparatively comfortable, we may take our leave, giving instructions to the nurse with regard to her future management, until our next visit; and these instructions should be clear, positive, and definite; for the patient's welfare and comfort so much depend on proper attention being paid her during the next few hours, that nothing should be left to the caprice or prejudice of a nurse. The first injunction to be given is as to the length of time she should be allowed to remain quiet, until her linen is changed, and she is removed from her position. If there be neither hæmorrhage nor faintness, she need not lie longer than an hour or an hour and a half from the time the placenta came away. The next must be with regard to the mode of removal. She must not be allowed to get off the bed, either to sit or stand; nor must she of her own accord move hand or foot in the way of exertion; she must have the dress in which she was delivered taken off as quietly as possible; fresh linen placed on her person; and she must be lifted, with the least possible assistance on her part, into the place previously prepared for her.

Bandage.—We must not omit to give directions about a bandage, or *safeguard*, as it is usually called, in the idiom of the puerperal chamber. Most frequently, indeed, the medical man's attention is called to the propriety of its application, either by the nurse or the patient herself, so that it seldom becomes necessary for him to give orders respecting it: for women have an idea that the more tightly their persons are braced after delivery, the more likely are they to preserve the symmetry of their form; and this is a point very near their heart. There

are few, indeed, who are careless about possessing a good figure; and so long as this prejudice prevails—while the female breast continues to throb with its present passions and desires—so long nothing will be neglected by them to improve those personal graces with which nature, in her prodigality, has enriched them. Some practitioners adapt the bandage themselves, and apply it immediately after the placenta has been removed. I think it preferable in common cases to leave this duty to the nurse; and that it should not be put on until the body-linen of the patient is shifted. Because, in the first place, it appears to me most desirable that perfect quietness should be preserved until the first changes in the uterus consequent upon labour are effected, that no disturbance may interrupt their progress; and in the second, I cannot help thinking that there is something highly indelicate in its being applied by a man,—much more so, indeed, than any of the duties we are ordinarily called upon to perform under natural labour. It is of most service when next the skin; it must be sufficiently broad to reach from the pubes, almost to the ensiform cartilage, and it cannot be properly adapted unless the abdomen be quite uncovered. In addition, I would remark that the nurse must know very little of her duties, if she cannot draw a properly contrived bandage round the person, and give it the due degree of tightness without incurring danger.

The principal object which the bandage serves is to brace the bowels, and give an artificial support, in lieu of that which they have lost through the laxity of the abdominal muscles; and to prevent the faintness frequently attendant on the sudden removal of a certain degree of pressure. It may to some extent, indeed, stimulate the uterus to more perfect contraction; but if that organ be unnaturally flaccid, it would be wrong to rely on compression by a bandage, to insure its more powerful action,

or prevent its cavity becoming distended with blood ;—in such a case, the only safe means of exerting sufficient external pressure is by the grasp of the hand steadily, and, for some time, unremittingly, applied.

The interval that should be allowed to elapse between the present and our next visit must depend on circumstances ;—it should certainly not be deferred beyond twenty-four hours, but it is much better that it should be made within twelve.

There are many points to which our attention must be directed upon our first visit. We must learn whether our patient has been much harassed with pain, and what sleep has been obtained ; for sleep, the grand restorer of wearied nature, is especially requisite after labour. It is fortunate if we are informed that she has had two or three refreshing slumbers. We do not expect uninterrupted rest, because she will be disturbed by the after-pains ; but if she has not suffered much from this cause of annoyance, and has enjoyed three or four hours' sleep during the first twelve or eighteen hours, we consider it as a good average. Of the nurse we require to learn whether any water has passed from the bladder, (for that is a matter of great consequence ;) and what sort of a discharge has issued from the vagina. The sanguineous discharge does not cease as soon as the placenta is expelled, nor ought it to disappear suddenly ; but a continual oozing of blood goes on from the uterine vessels, in a greater or less quantity, for some time after delivery. In scientific language, this flow is known by the name of the *lochia* ; among women, in general, by that of *discharge* ; and by the vulgar it is called *the cleansings*. For some days this discharge continues to possess all the constituent parts of the blood ; but it gradually loses the firmer portions and red globules ; and before its final departure it becomes of a serous cha-

racter, possessing a greenish tint; it is then known, in the language of the lying-in room, by the name of the *green waters*. This change in its character and appearance is the result of the continued contraction going on in the uterus. At first, when the uterine parietes are comparatively lax; when the vessels are of large diameter, and their apertures perfectly patulous, all the essentials of the blood are allowed to escape through them; and the discharge is consequently purely sanguineous: but after a time, in proportion as the uterus contracts,—as the vessels are diminished in their calibre,—as the openings through which the blood exudes become smaller,—the fibrin and red globules, by degrees, are prevented escaping, until at last the serum only oozes out, carrying with it the smallest possible quantity of the colouring particles. On any exertion indeed being used, and sometimes merely on the first rising from the bed, the discharge may assume a more florid hue, and be more copious than it had been for some time past: unless, however, this be to a debilitating extent, it is not usually necessary to enjoin any stricter confinement in consequence. If, then, on our first visit, we learn that the bladder has acted freely, although, perhaps, with some trifling pain; that the discharge has been sufficient to have required the removal of four or six napkins,—and that a small coagulum or two has also passed; we may consider the actions of the pelvic viscera so far to be going on in a healthy manner. We are not to expect that any fæces will have been voided; it is very rarely that the bowels act within the first twenty-four hours after delivery, unless diarrhœa have existed previously to the accession of labour.

After information on these points is obtained, we may require to place our hand on the abdomen, to ascertain whether the uterus is still contracted, and whether pres-

sure upon it gives pain; and we may, at the same time, learn whether the bandage is properly applied. If it has shifted its position up towards the bosom, as it frequently does, we must desire the nurse again to adapt it. We must, of course, make our observations on the tongue, pulse, and countenance: from the appearance of the latter, we shall gain more information than can be described. If the patient looks pale, haggard, anxious, and weary; if her features are shrunk, something is wrong: if, on the contrary, she is placid,—her countenance resuming its natural expression, even although more than usually pallid; while the pulse is seventy or eighty, the tongue and mouth moist and clean, there is every indication of a favourable issue of the case.

It is not right that we should leave the house, without taking some notice of the infant. We must learn whether it has passed urine and stools; and should the answer not be satisfactory, we must make a personal examination, that we may early detect any malformation which may exist in the rectum or external urinary organs.

We must also direct our attention to the state of the mother's bowels. It is the custom in London to give an aperient draught on the morning of the third day after labour. Castor oil, or a common black draught, will be found as efficacious as any kind of purgative; they both generally operate speedily and satisfactorily, without causing much pain. The dose should be repeated every four or six hours, till the bowels act; for it is highly desirable that evacuations should be obtained during the course of the third day.

A plan of diet must be laid down for some days to come. Nothing should be allowed but tea, toast, or farinaceous food, until the bowels are freely opened; and after the operation of the laxative, on the same day, a little beef-tea, mutton or chicken broth, may be given. Such

kind of nourishment is all that is required to sustain the system, under any depression the action of the bowels may have caused.

On the third day, the patient may take for nourishment some solution of animal matter; the next day, or day after, nothing forbidding, she may add to this a light pudding; and in a week she may be allowed a small quantity of solid meat. Stimulants of any kind, unless there be an actual necessity for them, never should be permitted until about the end of a fortnight, and then a glass of wine and water, or mild malt liquor, may be taken.

The temperature of the room must not be overlooked. Even in the midst of summer, the curtains are often found drawn close around the bed, and a fire in the chamber; and when the finger is laid on the pulse, it is observed to be quickened by the application of external heat, while, at the same time, a profuse perspiration bedews the skin. The curtains should be undrawn, that free ventilation may be permitted, and directions should be given that no larger fire be kept than is required for the purposes of the lying-in room. It is as well to hang a thermometer constantly in the apartment, that the temperature may be regulated every day. Between 62° and 65° will be found the most suitable warmth, both in winter and summer.

Till the middle of the last century, it used to be the practice to force a woman's system with spices and cordials, immediately after she was delivered; to prevent her enjoying a single breath of fresh air; to put sand-bags under the chink of the door; to nail the windows round with list, and take every possible precaution to oblige her to breathe over and over again the same vitiated atmosphere. A more sure method of exciting fever could scarcely be adopted. In more early times, plasters, fumigations, fomentations, cataplasms, ointments, and oils, mostly composed of stimulating or odoriferous drugs, were applied

to the abdomen and vulva, with the view of promoting a free lochial discharge;* and we are told that those women who had the misfortune to be in affluent circumstances, were compelled to submit to the infliction of a sheep's, or, in default of that, a hare's-skin, warm and reeking from the carcase of the animal flayed alive, which was placed round the abdomen, to cherish and protect them.† It is not wonderful that inflammatory, typhoid, miliary, and other fevers, were in those days rife; we can only be astonished that, in any case, nature had power to avert the dangers which such an interference with her laws, and subversion of her intentions, must have created.

These observations, however, refer particularly to the middle ages and succeeding years; for the ancients treated puerperal women as though they had suffered some violent and extensive accident, as we learn from the recommendations inculcated by Celsus.‡ They were confined for a certain number of days to the sparest diet, and severest regimen. Of the two methods, that advised by Celsus must be regarded, on the whole, as most consonant with reason;—nevertheless, no general plan can be universally applicable, but a deviation from it must in some instances be necessary.

The woman must be kept in the recumbent posture as much as possible, for at least a week. It is better that

* Mauriceau, vol. i. p. 374, 4to. edit.

† Guillemeau. See also Chamberlin's *Midwife's Practice*, p. 122. Chapman, in his *Treatise on Midwifery*, p. 259, strongly recommends this to be done *after a hard labour*. He states that "he has for many years had a happy experience of this method." Dionis, p. 361, translation, tells us that Clement applied a fresh sheep's-skin to the Dauphiness of France, after the birth of her first child, "but never afterwards, because it was thought it did more harm than good." Ambrose Paré (Johnson's Translation, folio, p. 557) advises that the after-birth while warm should be laid to the vulva, especially in the winter; and that in summer, the skin of a wether recently killed should be applied over the abdomen and loins for five or six hours. So that such filthy practices seem to have been very generally followed.

‡ Lib. vii. cap. 29.

she should not sit up, even to have the bed arranged, for that time. She may be moved daily from one side of the bed to the other, and lie on each alternately. In this manner she can have the advantage of a change every day. If the bed, however, heats her, or lying on it is very irksome, she may recline for an hour on a sofa, carefully preserving the horizontal posture. The ninth after delivery is looked upon, by women, as a critical day: many consider that, if they have so far escaped the dangers of the puerperal state, when that day is past they are safe from all the perils of their condition: and some think that however much they may have indulged their appetites before, and although they may have been up for some hours for the two or three preceding days, on that they are bound to fast and keep their bed. Although the prejudice of the ninth being a critical day is founded on error, it is as well to favour it; because it is highly desirable that every woman should be kept in a state of perfect rest, and should submit to be treated strictly as an invalid—at any rate, until that period of time has gone by.

After a week, she may get up, and lie the principal part of the day on a sofa. After a fortnight she may begin to put her feet to the ground, and she may take an occasional walk about the room: but the liberty allowed in this respect must depend very much on the continuance of the lochia. So long as the discharge is flowing at all profusely, the necessary changes going on within the pelvis are by no means perfected; but if it has almost ceased at the end of fourteen or eighteen days, we may suppose that the uterus has nearly re-acquired its small unimpregnated size, and that the parts are pretty well restored to their original tone.

We are expected, in this country, to give our attention both to the mother and her infant during the whole puerperal month; or at least until she has quitted her chamber: it is necessary that a visit should be made

daily, until the end of a week ; after which time, the attendance may be regulated according to the circumstances of each case. At every visit the state of the bowels must be particularly inquired into, and care must be taken that they act sufficiently. They are usually torpid while the woman is inactive, and it is requisite to repeat the aperient draught, or administer an enema occasionally. The bandage should be tightened, and the vulva sponged daily with warm water, to which a little spirit may be added. After three or four weeks, cold water may be substituted, and the parts may be liberally sluiced with it ; especially if the time of year be summer.

Suckling.—It is not generally that we are asked the question whether a woman should suckle her child or not ; or are called upon to interfere. If the patient be well, and she does not mean to suckle, she will not consult her medical man about it, because she knows his advice will go exactly contrary to her intentions : but if she be ill, and cannot, it is then our part to prevent her continuing her fruitless efforts, and to require that a wet nurse should be procured for the child.* Some women are averse from suckling, because of the trouble and confinement it necessarily occasions ; but others, on the contrary, regard it as the most grateful and pleasing office they can perform. No one will deny that it is the bounden duty of every woman,—provided she has health and strength, and means,—to nurse her own child, in whatever station of life she may be placed. She should forego the pleasures of society, give up the necessity of appearing in public, and waive the etiquette even of a court,

* The time when the infant should be first put to the mother's breast must vary considerably in different cases. If there has been a copious secretion from the mammary glands during the last few weeks of gestation, as sometimes happens, the child should be applied early, as soon indeed as the woman's strength is at all recruited, for it will bring her great relief : but if the breasts are flaccid and empty, a longer time must be allowed to elapse. Generally it is both safe and advantageous for the child to suck within twelve hours.

if those pleasures, or that etiquette, interfere in any material degree with her duties to her infant. I cannot allow that a physician would be honestly and conscientiously fulfilling the trust reposed in him, who did not, even in the highest grade of society, point out the dangers that may spring from this most natural and engaging employment being abandoned ; and I should always think better of that woman's feelings, both towards her husband and her infant, who gave it the advantage of her own breast.

No doubt it is much both to the mother's and child's happiness, comfort, and health, for the process of suckling to go on. Every thinking person will agree that milk, being the nourishment afforded by nature, is much more congenial to the child's wants than any extraneous food ; that it is most likely to afford suitable sustenance, and preserve the system in a healthy state. Nor is the function of lactation, indeed, less beneficial to the mother than her infant, although its benefits to her may not be so immediately apparent : for, putting out of the question the more obvious ill effects that flow from suppressed secretion,—such as inflammation of the glands of the breast, and consequent suppuration,—many less evident evils arise, among which may be enumerated congestion of the abdominal and pelvic viscera, and undue determination to the head,—the consequence of that blood which ought to be drained away from the general system by the breast, for the formation of milk, being suddenly thrown into other channels, and upon other organs :—so that, independently of the strong natural inclination which would prompt every woman to suckle, the child's safety and her own health should also stimulate her to undertake the gratifying and important office of a nurse.

One of the most frequent causes inducing a woman to decline giving her child the breast, is the existence of sore nipples ; and it certainly appears cruel to insist on a continuance of what produces so much pain. But we

have means to defend the tender organ; and we can cure the ulceration: and this in itself is seldom of sufficient importance to justify our allowing a mother to put her child away.

Sometimes, however, we find,—especially among the poorer classes,—that women will suckle longer than is desirable for their own strength, and for the health of their infants, under the belief that they are not susceptible of pregnancy so long as the least secretion of milk is kept up by the lacteal glands. To a certain extent this idea is correct; women are undoubtedly not so likely to become pregnant while nursing, as after the cessation of that function, provided they continue to suckle for the period only that nature intended: but if they exceed the just limit, keeping the child at the breast affords them little or no protection. Thus among the lower orders it is not very uncommon to see a woman suckling her last infant till within three or four months of her next confinement, much to the destruction of her health, and the undermining of her bodily powers. We mostly observe, indeed, that the milk in twelve or fourteen months after delivery decreases in quantity, and becomes deteriorated in quality; and the child now evidently requires other nourishment than what the breast affords. Some line, then, must be drawn at which the infant should be weaned; and perhaps, as a general principle, twelve or thirteen months will be found the most fitting time; for then its digestive apparatus will easily assimilate both farinaceous nourishment, and different preparations of animal matter.

IRREGULARITIES OF HEAD PRESENTATION.

Notwithstanding that, according to the arrangement which I have chosen, all varieties of head presentation are considered natural; still, as some are of infrequent

occurrence, they may be regarded as *irregularities*; and under that term I shall proceed to describe them.

VERTEX PRESENTATION, WITH THE FACE BEHIND EITHER GROIN.—When the foetal cranium enters the pelvis with the face situated behind either of the groins, (plate 36,) it must be evident, as I have before remarked, that the head is by no means so well adapted to the cavity, as when the face is directed to the ilium, (plate 34,) or looks diagonally backwards to one of the sacro-iliac symphyses, (plate 35); and this want of accommodation often induces a lingering labour, and sometimes obliges us to have recourse to instrumental aid.

But although a tedious case may be anticipated under this malposition; although the sufferings may be greater, and the time of duration more protracted than is usual;—the mere irregularity of situation is not of itself sufficient to warrant us in terminating the case by artificial means. We are not to interfere instrumentally because the face is placed anteriorly; but we must wait till some circumstances appear which call imperatively for relief and assistance. It matters not whether the face is looking backwards or forwards,—to one side or the other,—provided such symptoms arise as indicate danger, it is our duty not to allow them to become aggravated, but to deliver the patient by those means which are least likely to do injury.*

* The mechanism of the head's passage under this presentation will be found at page 135. When the face turns forwards on the expulsion of the head, the body passes with the back of the shoulders sweeping the hollow of the sacrum (plate 43). They then turn a little sideways; and the centre of the abdomen appears under one of the rami of the pubes, instead of being directed backwards as in the more ordinary cases. Professor Naegclè is of opinion that, when the vertex presents, the anterior fontanelle looks towards the left groin much oftener than is generally supposed; indeed, that this is by far the most frequent position, next to that in which it is directed to the right sacro-iliac symphysis: and he says *he is thoroughly convinced*, when the face looks diagonally forwards at the commencement of labour, that not the occiput, but the face, is generally turned into the hollow of the sacrum; and that

Mode of detection.—It is not very probable that this malposition will be distinguished before the membranes break ; because, as the vertex presents, the posterior fontanelle will first offer itself to the finger, and it will be difficult to detect the course which the different sutures take thus early in the labour. Besides which, I have already advised when we have positively satisfied ourselves the head is the presenting part, that we should not endeavour to gain further information respecting its precise position while the membranous cyst remains entire ; partly because of the difficulty of doing so, but principally because of the danger of inadvertently evacuating the liquor amnii prematurely. After the second stage, however, has commenced, when the expulsive pains are well established, we shall probably find that the head does not descend with its usual ease and regularity ; and on making as accurate an examination as we can, to ascertain the cause of the delay, we shall detect the posterior fontanelle at the back part of the pelvis, against one or other of the sacro-iliac junctions, and we shall be able to trace the sagittal suture running upwards and forwards, to terminate in the large diamond-shaped, open

“ this change in position requires no peculiarly favourable circumstances ; but that these species of labours can be completed by the natural powers under the most usual proportions, in the same time, with the same expense of strength, and without greater difficulty, than when the head takes the most common position.” He states, also, that out of ninety-six cases in which the face presented towards the left groin, (which he observed with particular care, and described in his note-book,) in three instances only the head cleared the passages with the face directed anteriorly ; and in all these three cases there were some peculiarities in the structure of the head or of the pelvis, to which he seems to attribute the forward inclination of the face.—(Rigby’s translation, page 45.) I am willing to acknowledge that in many instances the head will follow this three-quarter turn of the half pelvis, when the face has originally presented obliquely forwards ; but according to the commonly received opinions, and also to my experience, Nægelè has overrated the frequency, as well of this presentation as of the mode of the head’s passage, when it does occur.

space—the anterior fontanelle—situated behind the opposite groin, as would be the case in plate 36.

Being assured that the head occupies this situation, I would strongly enforce the recommendation not to interfere early in the labour, but to wait in the hope and expectation, either that it will be expelled in the manner described at page 135; or that the face will be gradually turned backwards into the hollow of the sacrum, and eventually make its exit, sweeping the perineum. Presuming, however, that after a number of tolerably strong expulsive pains, no advance takes place in the situation of the head, it will then be proper to embrace the cranium between the three first fingers and the thumb of one or other hand, and to give the face an inclination to the right or left ilium, according as its original direction was to the right or left groin: and this attempt must be made in the absence of uterine contraction, and before the head has become locked in the pelvic cavity; for if it be delayed till a state of impaction has occurred, the malposition cannot be remedied by the power of the hand alone, and instruments will most likely be required in order to finish the delivery. In making this change in the position of the head, it would not be right to turn the face at once into the hollow of the sacrum, even if that could be accomplished; because the probability is, that the child's body, being held tight within the contracted uterus, would not follow the sweep which the head describes; and we should incur great danger of injuring the neck. All that we are required to do, is to incline the face to one of the ilia, and leave the rest of the process to nature.

Face directed to the promontory of the sacrum, or the symphysis pubis.—It is very rarely that the head offers itself, at the commencement of labour, above the brim of the pelvis, with the brow directed either against the promontory of the sacrum, (plate 37, fig. 1,) or the symphysis

pubis, (fig. 2); so rarely, indeed, that some practitioners of great respectability have denied the possibility of such an occurrence.* From my own observation, however, I am perfectly satisfied that both these presentations occasionally do take place. Under this position the head is placed with its longest diameter in the direction of the shortest diameter of the pelvic brim; and if the head and the pelvis be of average dimensions, it is impossible for the head to occupy the cavity, unless a change in situation either occur spontaneously, or be effected artificially.

Diagnosis.—In this case the vertex is observed to lie quite above the brim of the pelvis, almost out of the reach of the finger as introduced in a common examination. But although, from the difficulty in feeling the presenting part, suspicion may be excited that the position is irregular, the peculiar nature of that irregularity will probably not be determined until after the membranous cyst has given away. On the second stage of labour, however, having commenced,—following the general directions before laid down,—it is right that an accurate examination of the head, and of its bearings in relation to the pelvis, be made, and we shall find the sagittal suture running from before directly backwards, and not laterally or diagonally. We may then be assured that the face is looking either towards the promontory of the sacrum or symphysis pubis, and positive knowledge on that point will be afforded by the situation of the anterior fontanelle. In relation as this fontanelle is directed backwards or forwards, so will the face be situated.

I have no doubt that this malposition is in many instances rectified by nature herself; that (the force of the uterine contractions being resisted, by the approximation of the pelvic bones in their conjugate diameter,

* See p. 136.

which do not afford due and proportionate space for the descent of the head thus placed) the mechanical impediment offered occasions a turn, with the face to one or other side, on the same principles that regulate the turn which is observed to occur in all natural cases, just before the head escapes externally. There is no more difficulty in believing that such a change of position is likely to happen at the upper than at the lower pelvic aperture.

Being satisfied, then, of the situation of the head after the membranes have broken, having watched the effect of two or three pains, and observing that it evinces no disposition to accommodate itself to the dimensions of the pelvic brim, it is proper,—lest the woman become worn out by inefficient struggles, and lest the cranium become wedged in this unfortunate position,—to follow nature's dictates, and incline the face laterally. This alteration in situation it would not be difficult to effect, by grasping the head between the three first fingers and thumb introduced into the vagina, provided the os uteri were well dilated, the vagina and perineum sufficiently relaxed, and the head remained above the brim, perfectly moveable, free, and unimpacted. On this slight alteration being made, the head will enter the pelvis, all the difficulty will be over, and the case will be reduced to one of the most ordinary character. If, however, we cannot accomplish this object, let us then be guided by the general rule—to which there is no exception—that of waiting till either the lapse of time, or symptoms of danger, require instrumental interference.

BROW PRESENTATION.—Other parts of the head besides the vertex may present. The anterior fontanelle, or brow, may be the depending part; and under this presentation the face may offer itself at the pelvic brim, looking to one ilium or the other—obliquely backwards to either sacro-iliac synchondrosis—obliquely forwards to either of the groins—directly forwards to the symphysis pubis—or

directly backwards towards the promontory of the sacrum ; in the same manner, indeed, so far as regards the points of the pelvic parietes, as though the vertex presented.

Under either of these malpositions the head is still less adapted to the passage than when the vertex presents with the face forwards, since much greater space is required for its transmission. It has been shown in plate 7 that the same cranium, when the brow or face is directed first, requires a space of nearly an inch more in the longest diameter, than when the vertex is protruded.

Brow presentation ; the face looking diagonally backwards.—In all cases where the anterior fontanelle offers itself originally, there is a natural inclination for the case to be converted into a perfect face presentation ; and this is owing to the fibres of the fundus uteri exerting themselves strongly upon the foetal body ; under which action the shoulders are pressed downwards, the chin is gradually separated more and more from the chest, and the head is expelled in the manner hereafter to be described.*

It is very probable that the presentation of the anterior fontanelle may be detected before the membranes rupture, because of the large space it offers to the finger : but even should this information be obtained thus early, little can be done towards rectifying the position until the liquor amnii is spontaneously evacuated ; since, under any attempts we might use, we should almost unavoidably destroy the integrity of the membranous cyst, which it is of such essential importance to preserve whole. It is necessary that the case should be watched carefully and narrowly ; and that, on the rupture of the bag, an accurate examination should be instituted, with the view of determining

* If plate 44, which represents a presentation of the brow, with the chin to the left sacro-iliac synchondrosis, be compared with plate 45, in which is depicted a face case with the chin to the left ilium, it will be easily seen how the power of the uterine contractions tends to convert a brow into a complete face presentation.

whether the face lie forward, backward, or laterally. In the case now under consideration, the sagittal suture, which becomes our guide, is traced from the anterior fontanelle running obliquely forwards and upwards to one groin or the other. There can then exist no doubt, first, that the anterior fontanelle presents; and, secondly, that the face is placed backwards in relation to the pelvis.

Inasmuch as a considerably greater space is required under a presentation of the brow than when the vertex depends; inasmuch as there exists such a disposition to convert the case into a face presentation; and inasmuch as the labour is usually protracted, and attended with a proportionably increased degree of pain; it would naturally follow that we should endeavour to place the head in a more favourable position, by throwing the chin more upon the chest, and causing the vertex to descend; provided this could be accomplished without incurring danger, without any aggravation of suffering, and without the formidable appearance of preparing for an operation. This object can frequently be gained, if the position be detected soon after the rupture of the membranes, and before the head has perfectly engaged in the pelvic cavity, by a very simple and easy method: it only requires that steady pressure should be made upon the brow with the extremity of the finger during the urgency of pain, so that the forehead may be arrested at the spot to which it has attained, and the powers of the uterus be expended upon the back part of the head. It is then usually observed that the head is bent forward on the neck, as on a hinge; the vertex comes down, the brow remains stationary; and thus the case may be made one of the most simple, natural, and easy. We can only succeed, however, in this endeavour during the paroxysm of pain: we are not to expect that we shall be able to *push* the anterior fontanelle *up above* the brim; our only intention should be to prevent it passing *down further*, and to

give an opportunity for the back part of the head to occupy the pelvis more completely. This counter-pressure, nevertheless, must be made with caution, tenderness, and judgment.

Brow presentation, with the face forwards.—The anterior fontanelle may present with the face looking forwards to one or other groin; and this position is even more unfavourable than either of those just described; because not only is that part of the head presenting, which in itself requires a considerably increased space, but it is placed in a most awkward situation as regards the pelvis. There is the double disadvantage of a brow presentation, and the face being directed forwards. There can be but little difficulty in detecting this position, at any rate, after, or even previously to, the rupture of the membranes: the anterior fontanelle is easily discriminated, and the sagittal suture can be traced running obliquely backwards and upwards, until it terminates at the superior angle of the occipital bone, in the direction of one of the sacro-iliac symphyses.

The same remarks just made respecting the propriety and necessity of giving a new inclination to the head, apply with equal truth, and even more force, to the variety now under contemplation. There is the same chance of the case being converted into a face presentation,—the same likelihood of a protracted termination; and we possess almost an equally easy and effectual method of rectifying the unfortunate position. Counter-pressure, during the time of pain, will here also avail us much; not, however, directed on the centre of the brow, but on one side, just above the temple. We may often succeed in preventing the chin passing downwards, in making the vertex the most depending part, and in throwing the face a little backwards. If we can cause the head to move in the slightest degree, so as to direct the forehead opposite the iliac fossa, we shall find that nature will

eventually turn it with the face into the hollow of the sacrum. Should these attempts, however, not prove successful, the head may be embraced between three fingers and a thumb, and a rotatory inclination given to it: the proper change can thus generally be effected, unless indeed some time has elapsed since the membranes broke.

The presentation of the brow with the face directed towards the promontory of the sacrum or symphysis pubis, is even more unusual than the same direction of the face, the vertex presenting; there will be equal or even more difficulty in its passage through the brim; the same means must be taken to detect its situation, and the same attempts used to place it in a more favourable one.

FACE PRESENTATION.—I am inclined to think that most of the face presentations which we meet with in practice were originally brow presentations, and have been changed by the action of the uterus in the way I have already specified: however, there is no question that the face sometimes offers itself even at the very onset of labour. Various are the positions in which a foetus, when the face presents, may be placed; but this is the most common. The crown of the head is directed to one ilium; the chest towards the other, and a shoulder towards the sacrum and pubes respectively. (Plate 45.) As the case progresses, the face descends down into the pelvis, until the summit of the head impinges on one ischium; and the chin on the other. The direction of the head is then totally altered; the chin appears under the arch of the pubes, and the occiput sweeps the perineum. (Plate 46.) This change, I believe, always takes place; at least I never knew an instance of face presentation, in which the head was expelled with the upper and back part emerging from under the pubic arch. This case requires even more room than any yet discussed; and if it be a first child, it is generally attended with great difficulty and distress: but if the parts be well relaxed—if the

pelvis be good, and the pains strong—as a general principle, face presentations will be terminated with little or no assistance.

Mode of detection.—It is not very difficult to detect a face presentation, even before the membranes break; or rather it is easy to determine that no part of the cranium, properly so called, presents; for the face is readily distinguished from the harder parts of the head. On making an examination, an irregular soft body meets the finger, which indeed, unless we are careful in our inquiry, we may possibly mistake for other parts of the child. The face has not unfrequently been confounded with the breech—of which I have known more than one instance; the cheeks have been taken for the nates, and the mouth for the anus. The prominence and regularity of the features will necessarily be our discriminating marks. Thus we may feel the nose about the centre; the two eyes above; the chin below, and the mouth, differing from the anus in shape, size, and in possessing lips;—the gums and the tongue can often be felt also after the liquor amnii is discharged; and then doubt can exist no longer. Besides these sufficiently striking features which indicate the face, the breech possesses certain distinctive marks of its own, to be hereafter particularly noted. If we are satisfied with simply placing our finger against the puffy cheek, we are very likely to fall into error; but we are not to form an opinion by one part alone—we must take all the points that we can reach as diagnostic marks.

It becomes a most important question, whether under a face presentation any means should be adopted to place the child in a more favourable position. So difficult, and almost impossible, was the transmission of the head under this presentation (as well as some other of these irregularities) at one time thought,* that it was recommended

* See Dewees' Mid. par. 654.

that the hand should be introduced into the uterus—that the feet should be laid hold of, and that the child should be delivered by *turning*. This operation, performed under the most favourable circumstances, is always attended with great pain, and frequently with great danger—danger both to the mother and the child;—to the mother, from the chance of injury to which her structures (particularly the uterus) are exposed—to the child, in consequence of the pressure which the funis umbilicalis must more or less experience, when the head is passing through the pelvic cavity. All these circumstances, then, being taken into consideration, the practice of changing the position of the child under a face impression, by *turning*, is now almost entirely exploded; and we rather leave the case to nature, so long as we can safely trust her, than subject the woman and the infant to such dangers.

But suppose, on watching the case, we find no advantage gained—no alteration in the position of the head—no advance from hour to hour—what then is to be done? We must here also act upon the same unerring principles before laid down, wait till symptoms require our interference, and then use that instrument which seems most applicable to the emergency. For it is impossible, by any counter pressure, to make a beneficial change in the situation of the head under a face presentation. We cannot cause the head to turn upon the neck, so as to approximate the chin to the chest, by pressure applied by the finger; nor can we, indeed, succeed in producing the same alteration by the introduction of the hand over the vertex, the adaptation of the points of the fingers to the occiput, and the application of gentle traction: as some have recommended.* The vectis, then—provided any instrument be required—will be found the most appro-

* Baudeloeque, par. 1337, advises this method of rectifying the position, before the head has engaged in the pelvic aperture. See also par. 1370.

priate. Face and ear presentations, indeed, appear to me the only cases in which the forceps does not possess an absolute superiority over the vectis.

The features of a child born under a face presentation are generally much swollen, turgid, and livid. We must be prepared, therefore, to expect some disfigurement; which, however, will generally disappear in a day or two.

EAR PRESENTATION.—Ear presentations are by far the most rare of any of these irregular positions of the head. Either side of the head may present; the face may look to one ilium or the other, or to the pubes or the sacrum.

As illustrative of the mechanism of ear presentation, I will suppose a case in which the face is looking backwards; in which the summit of the head is directed to the right ilium, and the left shoulder impinges on the left ilium; and in which the ear meets the finger, immediately on being passed up to the pelvic brim. (Plate 47.) In this position, provided the head clears the brim, it is usually propelled into the pelvis in proportion as the trunk of the child advances, until it comes to press low down upon the outlet; but in consequence of its being doubled sideways on the shoulder, the space required for its exit thus is more than the inferior pelvic aperture affords, and before it can escape it must take a fresh direction: a change in situation, therefore, is effected;—not, indeed, a semi-rotatory turn, such as the head describes under the presentation of the vertex, but the summit of the head passes downwards, moving on the joints of the neck as on a hinge; the face is by degrees thrown into the hollow of the sacrum; and the occiput is turned up under the arch of the pubes. If the face is looking forwards above the symphysis pubis, the case will be surrounded by increased difficulties; but, upon the whole, the remarks just made are generally applicable to all ear presentations.

Mode of detection.—There can be little difficulty in detecting an ear, or in determining how the head lies, when we touch it. There is no part of the foetal body we are likely to confound with the ear. We can feel the different parts of the organ itself, and the bony head surrounding it. We can feel the helix or flap, and the tragus or sessile part; we know that behind the helix is situated the occiput, and anterior to the tragus, the face; and these points will immediately lead us to distinguish the true position of the head as regards the pelvis.

Having, then, detected the ear, and ascertained the situation of the head, three modes of proceeding offer themselves for our choice. We may either turn the child and extract it by the feet; or we may endeavour to bring down the vertex; or, leaving the case for some time to nature, we may hope that the head will gradually assume a more favourable direction. Doubtless there are particular cases to which each of these means may be applicable; but, upon the whole, the observations I have just made regarding the management of face presentations are equally valid in this case. Turning is not generally required, and should not be thought of after the membranes have broken; no good can be effected by counter-pressure; I cannot see what advantage could be gained by the introduction of the fingers over that side of the head which lies uppermost, even if they could be passed up without difficulty; and it is certainly not necessary to interfere instrumentally, merely because the ear presents. The common principle must here direct us; we must wait patiently, in the hope that nature will effect her object; and should the head remain stationary for some time, or should constitutional symptoms of distress supervene, delivery must be effected instrumentally; and that may probably be accomplished by the vectis.

DIFFICULT LABOUR.

The second class of labours, DIFFICULT OR LABORIOUS, embraces two orders, *lingering* and *instrumental*.

LINGERING LABOUR.—I have defined a *lingering labour* to be a case in which the head presents; which occupies more than twenty-four hours from its commencement to its termination; which is concluded without the necessity for instrumental or manual interference; during the progress of which no dangerous or unusual symptoms manifest themselves; and in which nothing calling for anxiety occurs, except the length of time that elapses under its continuance: so that it differs only from a natural labour in respect of its duration.

We sometimes hear of a woman being in uninterrupted labour a week, ten days, a fortnight, or even longer. Such an idea is perfectly absurd: the powers of the system could not bear up against the exertion of labour for so protracted a period. Besides which, the active agents could not support their operations for so long a time: for the uterus, whether it is muscular in structure or not, obeys the laws of muscular action under parturition; its powers become gradually enfeebled, under a continuance of excessive toil, and it is at last entirely disabled through exhaustion: with the cessation of its action, the process of labour is also at a stand. This is exactly analogous to what we observe daily and hourly in the truly muscular structures: when fatigued, they contract feebly and unwillingly, and when their powers are exhausted they can exert themselves no longer. Such cases, then, of reputed prolonged parturition, are dependent on false, irritable, spasmodic pains, situated in some other part of the body; by which, as we have already learned, women are frequently harassed towards the close of gestation; but which are perfectly unconnected with, and independent of, contraction in the uterine fibres.

In estimating lingering labours, we calculate from the first commencement of true uterine action; but in estimating the length of labour, in reference to the patient's strength, and its effects on her system, we principally take into consideration the time that has elapsed since the membranes broke; for it is reasonable to infer that no great exertion has been sustained—consequently that little or no exhaustion has appeared; and particularly, that scarce any injurious pressure can have taken place on the soft parts within the pelvis, while the membranous cyst remained entire; provided there be an ordinary quantity of liquor amnii. Thus, when called to a case of lingering labour, in considering the chance of injury from its duration, our mind should be directed, not so much to the interval which has elapsed since the first accession of uterine pains, as to the time at which the membranes ruptured; and that should be looked upon as the period when it was possible for dangerous pressure to have commenced.

CAUSES.—Many and various are the causes which may produce a lingering labour. They may be arranged under two distinct heads—those which are referable to the mother, and those in which the ovum is at fault. The causes referable to the mother are—

First, the want of sufficient power, or the absence of sufficient energy, in the uterus itself;

Secondly, the want of sufficient room in the bony pelvis, to admit the ready passage of the fœtus;

Thirdly, the presence of one or more tumors in the pelvic cavity;

Fourthly, rigidity of the os uteri, vagina, and perineum—one of these organs being affected singly; or a combined rigidity of the whole tending to retard the progress;

Fifthly, a cicatrix, or membranous impediment, existing in the vagina; and,

Sixthly, obliquity of the os uteri.

Those causes of lingering labour referable to the ovum are said to be—

First, preternatural toughness of the membranes;

Secondly, the head being larger than common, from natural healthy formation, deformity, or disease;

Thirdly, the head being too strongly ossified, though not of larger dimensions than ordinary;

Fourthly, malposition of the head;

Fifthly, ascites or tympanites of the foetal abdomen;

Sixthly, the umbilical cord being unnaturally short, or being twisted around the body or limbs of the foetus;

Seventhly, unusual bulk of the trunk or limbs; and,

Eighthly, monstrosity.

Some of these causes in which the child is at fault, exert a great influence over the duration of labour; while others possess no power whatever in retarding the process, as far as the head is concerned.

Inefficient uterine action.—Labours rendered tedious, or lingering, from this cause, are generally observed in constitutions debilitated by previous disease, by excessive discharges, or some other depressing action. We often remark, also, that the uterus acts feebly when the woman has previously borne a large family. In this latter instance, indeed, the organ does not obey the laws of muscular action; for the more frequently muscles are called into powerful contraction, the stronger they become;—the uterus, on the contrary, usually displays less energy when its peculiar powers have been often exerted in childbirth.

This cause of lingering labour is known by the pains being weak; the intervals at which they succeed each other distant; the space of time during which they continue short;—while, at the same time, there probably exists a good pelvis, and a sufficient degree of dilatation and laxity of the passages to allow the escape of the foetus, provided the propelling powers were adequate to the

end. In some cases, where the delay is attributable to inefficient uterine power, the sanguiferous system may also be acting with diminished force; and there are perhaps other symptoms present, indicative of general debility. It is not likely that we shall find much difficulty in detecting this cause of lingering labour.

Treatment.—Under these circumstances, it becomes our duty to endeavour, if possible, to rouse the uterine energies; by doing which we may probably prevent the necessity for instrumental delivery. This object we can sometimes easily effect. The pains may be augmented both in frequency and strength, and may even occasionally be restored after they have been suspended for many hours;—by warm diluent drinks;—by stimulants taken into the stomach;—by particular medicines;—by friction and other external means;—and by a change of posture.

Of all the methods employed for the purpose of increasing inefficient, and restoring declining pains, none are more frequently had recourse to, and none are less injurious, than warm diluents; they are the simplest that can be used, and are often successful. It is very common for the nurse, when the uterine contractions are weak, short, irregular and distant, to propose that some gruel or tea should be given “to bring back the pains.” If such nourishment be grateful to the patient, if there be no tendency to vomit, or if she feels to desire it, there can in few cases be any objection to the exhibition of warm diluents; and they may be given almost *ad libitum*. To stimulants, as a general principle, under labour, I am decidedly adverse; and consider it as a maxim never to allow them, unless some degree of faintness be present; or a languid state of the general system indicate their propriety: because the excitement they cause must be followed by a corresponding depression; and they may tend either to induce fever, or hurry on exhaustion. Before stimulants are exhibited, many things must be

taken into consideration; such as the state of the pulse and skin; the length of time the labour has lasted; the strength of the pains; the degree of faintness the patient is suffering; and the kind of discharge. Should the pulse be weak and slow, the surface colder than natural, the uterine contractions powerless, and the system depressed, while at the same time there is no blood flowing through the vagina, nor any symptom of internal and concealed hæmorrhage, stimulants are called for; and either the domestic or medicated may be allowed.

Various specific medicines have been recommended at different times, to increase the parturient throes, and facilitate the child's birth; but I believe that the whole of these substances, one only excepted, act upon the womb through the excitement induced in the arterial system. They first stimulate the nervous, then the arterial, and through the medium of those systems, the uterus. Almost the only medicine now used as an uterine excitant, is the *ergot of rye*: and I have no hesitation in declaring my opinion that its action is specific, and that the uterus is not affected through any disturbance first set up in the arterial system.

The *secale cornutum*, ergot, or spurred rye, is the produce of a disease in that plant, with which one or more of the grains in different ears are simultaneously affected. When attacked with the "spur," the corn first becomes softish and pulpy; and soon bursting from its husk, obtains solidity, and assumes a lengthened form, slightly curved, and pointed at the extremity; its hue is in the first instance red, but it soon changes to a dark violet, or blackish colour. The diseased grain varies much in length, sometimes being perfectly concealed within its husk, at others growing to nearly an inch and a half; its usual length is about an inch, and its general appearance resembles much the spur of the cock. As we obtain the

grain, it is dry, and breaks with a crisp irregular fracture, somewhat like a dried almond. On being divided, it is seen to consist of a dark cortical and internal bluish white substance; it has no heating qualities, is not unpleasant to the taste, but possesses a slight mawkish flavour. Almost all the grains, and many of the other grasses, are subject to this affection; but it is most usual in rye, and most frequently taken from that plant for medicinal purposes. Wet seasons are particularly favourable to its production; it is sometimes observed in this country, but is more common in Switzerland, the south of France, and in North America. The disease destroys the germinating power of those particular seeds which are attacked with it; but does not affect the sound grains in the same ear.

The ergot in fine powder is of a perfect ash colour, and its infusion of a dingy violet.

The drug has been exhibited in various forms, chiefly in powder, infusion, decoction, and tincture. The two first are in my opinion the best modes. If given in fine powder, about twenty grains is the proper dose; but I am myself generally in the habit of exhibiting it in infusion. Two drachms may be infused in four or six ounces of boiling water for twenty minutes; a fourth part of the strained liquor should be given at a time, and under labour the dose may be repeated every quarter of an hour, until either its action becomes apparent, or the whole is taken; for I consider it useless to persevere with the medicine, if the quantity mentioned produces no effect. I have found that if the infusion be allowed to stand much longer than the time I have specified, it acquires a nauseating property which greatly distresses the stomach. Desgranges* used only the black cortical part, in which he considered its active principle to reside: he gave

* Neale on the Ergot, p. 42.

it in doses of four or six grains, which he found as efficacious as thirty grains of the whole powder. Villeneuve administered it in *lavements*; and he considers this the most efficacious means of employing it, provided there be present much irritability of the stomach.

I have given the ergot, in the doses recommended every four or six hours, for many successive days, on several occasions, and never knew it produce any bad effects upon the mother, except occasionally nausea and vomiting. Usually there is no more influence perceptible on the general system than would be observed after taking a cup of tea; but its effects upon the uterus in labour are often speedy, powerful, and astonishing. Its action mostly commences within fifteen or twenty minutes after its exhibition; and the character of the pains induced through its agency differs materially from the ordinary throes of parturition; so that it is possible in many cases to discriminate them, as being actually produced by the drug itself;—they are stronger and more constant than the common pains of labour. When the ergot has obtained a full power over the system, the uterus often acts without any decided intermission for many minutes together;—there being only a slight remission observed—no interval of perfect ease. This remark has been made by Ingleby* and many other physicians; and I have had myself an opportunity of observing its truth on many occasions.

As the ergot undoubtedly possesses such a strong influence over the uterine system, it is evident that, if exhibited improperly, it is likely to do great injury.

There are many cautions, then, necessary to be attended to in adopting and employing it. Its exhibition must not be thought of in any case where a disproportion exists between the head of the child and the pelvic cavity; we

* On Uterine Hæmorrhage, p. 79.

should incur great danger of inducing contusion, inflammation, and laceration. Neither must it be exhibited where there is any disposition to rigidity of the parts,—either the os uteri, the vagina, or the perineum,—through fear of the same dangers. As a principle, it is not usually necessary in first children, and therefore this is a case in which we generally should make an exception. It must not be given in any case where the lingering labour depends upon a malposition of the head. It may be admissible occasionally in breech presentations; but in no case of transverse position of the fœtus, provided the term of gestation is nearly completed, should we ever contemplate administering the ergot. It must only be given in cases where the sole cause of delay is a torpid or feeble state of uterine action; or where it is desirable to terminate the labour speedily,—and that too by means of the natural powers,—in consequence of hæmorrhage. I have found it very useful in accidental hæmorrhage after the membranes have been ruptured; in loss of blood under abortion also, where it was impossible to empty the uterus by manual operation; and where the patient would perhaps have sunk from the continuance of the bleeding.

But although I am perfectly convinced of the powers which the ergot sometimes displays under parturition, I am by no means inclined to agree with those practitioners who think that this medicine will entirely supersede the necessity of any other means being used in lingering labour. I cannot coincide in the opinion expressed by Mr. Michell,* that its general introduction will so completely supersede the use of the forceps, that “he would not be surprised if in twenty years that instrument should be known only by name.” Nor in his remark, “that except in the rare cases in which the Cæsarean operation

* On the Ergot of Rye, 1828, p. 56.

was formerly recommended, he conceives there will now be no occasion for instrumental aid in midwifery."

Authors vary much in the statements they furnish of their success with this grain. This discrepancy may partly be accounted for by the ergot in some of the trials not being fresh, since, by being kept too long a time, it loses its virtue. It may also be owing partly to the constitution of the patient not being susceptible of its peculiar action. We know that some persons are not susceptible of the peculiar action of mercury; and we may easily believe that in the same manner some constitutions may be insusceptible to the peculiar action of the ergot of rye.

Stimulating clysters, principally composed of the purgative salts, have often been found useful in exciting the uterine fibres to more powerful contraction. External means are sometimes had recourse to for the same purpose. Warmth, applied by hot flannels to the hypogastric region, to the legs, the thighs, and the back, has been tried, but has seldom been found efficacious in restoring uterine action, unless there existed also at the same time depressed arterial energy, or a cold surface. Under such circumstances we should not only apply warmth externally, but give warm diluents, or perhaps stimulants. Pressure and friction are found to possess greater power over the uterine fibres than warmth externally applied. The pressure of a bandage, or the hand, will often excite the uterus to increased action both before and after the birth of the child. It will be shown, that in cases of hæmorrhage after delivery, dependent on a flaccid state of the parietes of the womb, we possess no more serviceable means to ensure their permanent contraction than the application of pressure by the grasp of the hand; and although pressure acts more energetically upon the uterus when the organ is more or less emptied of its contents,—especially after the birth of the child,—yet firm steady pressure will sometimes

excite it to more vigorous contraction, even while it contains the fœtus within its cavity. Friction with the open palm previously to the birth of the child is more frequently had recourse to under this kind of lingering labour than more simple pressure, and a most efficacious agent it sometimes proves.

I am inclined to think that electrical shocks—particularly derived from the galvanic battery—would excite the flagging powers of the uterus under labour, and perhaps even induce action *ab initio*. This is a means, however, of which I would not, in the present state of our knowledge, recommend a trial; and I only judge by analogy, in consideration of the influence the electrical fluid exerts over the nervous system generally, and through that system, over muscular fibre.

We may sometimes also succeed in rendering the uterine contractions stronger and more efficient by changing the patient's position, particularly from the recumbent to the upright posture; and as this is a very simple means, as it is often useful, and as the change brings her great relief, she may be advised to sit, stand, or walk, as her own inclination dictates. The effect is most probably produced by the gravitation of the head upon the os uteri.

Before concluding this part of my subject, I must repeat the caution previously given against unnecessarily rupturing the membranes during the first stage of labour. It has of late become very much the practice,—attributable in some measure, perhaps, to the recommendations inculcated by Professor Burns*—to evacuate the liquor amnii in all cases where the uterus is acting feebly; and some instances have come under my own observation, in which not only has this act disappointed the intention of the operator, but been followed, after the lapse of some time,

* Principles of Midwifery, 5th ed., p. 403.

by such symptoms as required that the labour should be terminated instrumentally. I do not mean to assert that a protracted case is always a necessary consequence of such interference; for in many instances where the os uteri is perfectly dilatable, where it has acquired a diameter the size of a crown, and especially where there is an excessive quantity of liquor annii present, the evacuation of the water—by causing the head to bear more decidedly on the os uteri—will increase the vigour of the contractions, and bring about a more speedy termination. But I allude to it as a generally adopted principle; and cannot but consider that such an interruption of nature's ordinances requires in practice the greatest possible judgment and discrimination.

Nor must I allow the custom of irritating the mouth and neck of the womb with the finger, and rubbing it down the back of the vagina, along the rectum, to pass unnoticed; nor that still less justifiable mode of proceeding—the endeavour to dilate the os uteri by the two first fingers introduced within it; which last means also has received the sanction of the deservedly great name of Professor Burns,* as applicable to some states of the os uteri; but which I do not feel myself warranted in mentioning except in terms of reprobation.

The practice indeed might be followed with less danger, if the cautions with which the professor has surrounded it were always borne in mind and acted on; but the chances are, that the principle alone will dwell in the memory, and little heed will be taken of the kind of cases in which it is recommended as useful.

THE SECOND CAUSE of lingering labour embraces those

* *Op. citat.* p. 401. The late Professor Hamilton, (*Practical Observations*, 1840, p. 125,) by quoting Burns' opinion and practice on this subject at length, appears to adopt them as his own; and we may fairly conclude that he gives them the sanction of his authority.

cases in which the uterus is acting powerfully and energetically, but where there is a want of due and proportionate space in the passages for the ready exit of the child: and of these causes, *distortion of the pelvic bones*, as being one of the most frequent and difficult, claims our first attention.

Three Varieties.—As in a former part of this publication I arranged pelves in general into four classes, so we may now, for practical purposes, divide distorted pelves into three varieties.—the *first*, in which the pelvic brim is so contracted as not to permit any part of the child's head to enter through it; the *second*, which has allowed the head to descend so low as to occupy the whole or the chief part of the cavity, but whose outlet is too narrow to admit of its escape; and the *third*—of that intermediate size—which has permitted some portion of the head to enter through the brim, and partially to take possession of the cavity; while the principal bulk remains above. These three cases practically assume a very different character, and require therefore a distinct consideration.

First Variety.—When we have perfectly satisfied ourselves, by an examination *per vaginam*, that the pelvis is so diminished in its proportions that no part of the child's head can pass through the brim, it becomes our duty not to allow the patient's strength to be undermined by the fatigue necessarily attendant upon such a labour; but early to have recourse to some means for the purpose of relieving her: because it is physically impossible for a head to be eventually expelled whole through a pelvis whose capacity in the superior aperture is so contracted as not to admit any portion of it, after the evacuation of the liquor amnii, and the full establishment of powerful expulsive pains.

Such being the case, the means to be adopted must become a most interesting and important question: and if, upon a measurement conducted with the utmost care, we

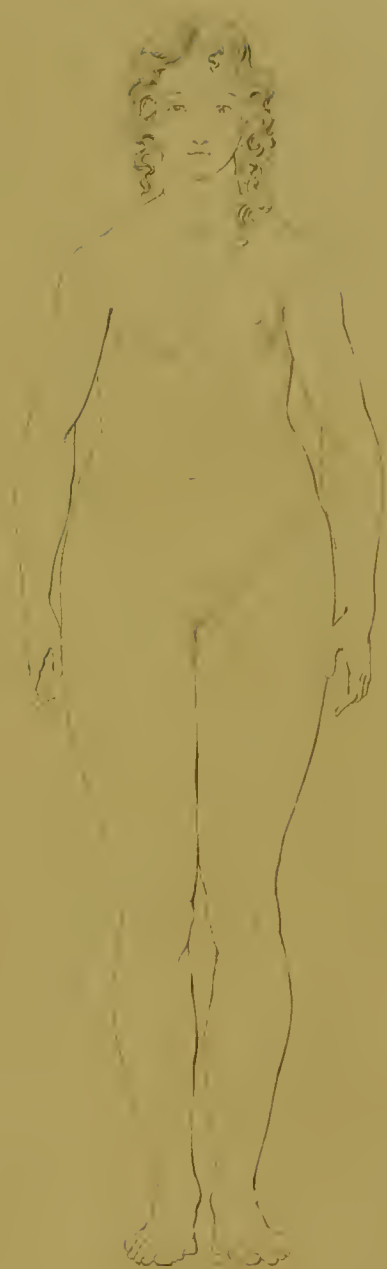


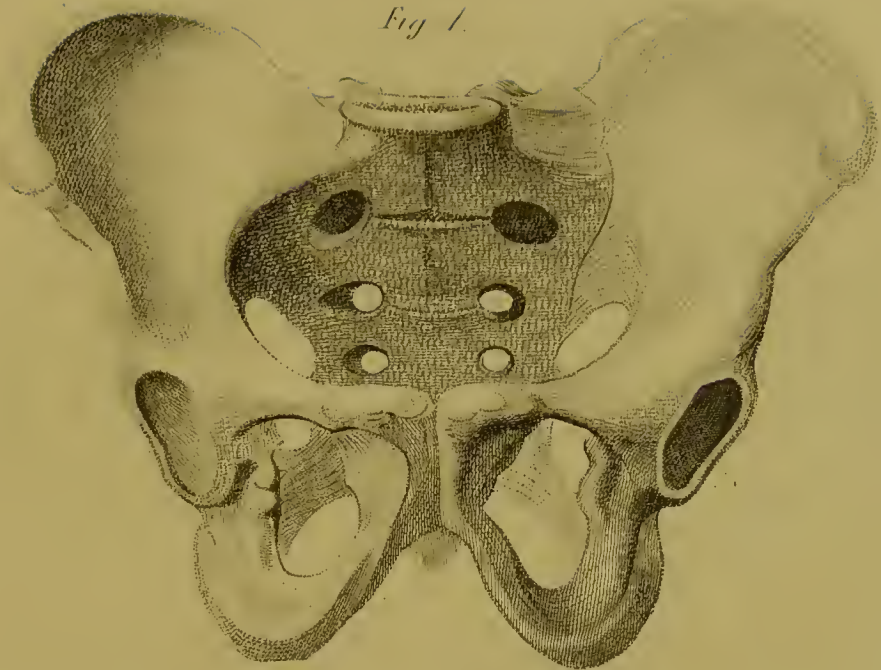
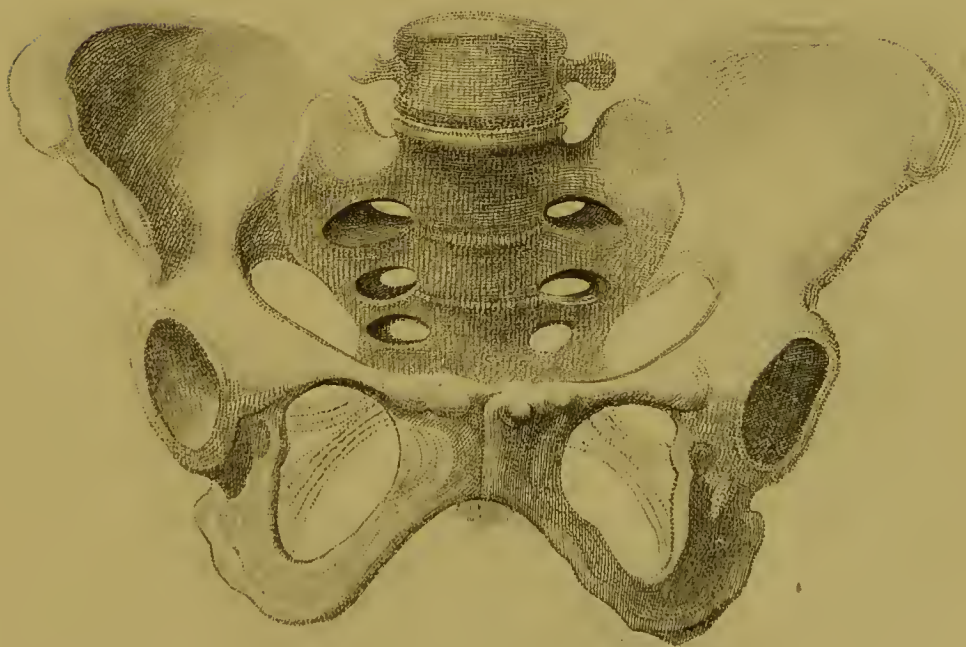
Fig. 1.*Fig. 2.*

Fig 1

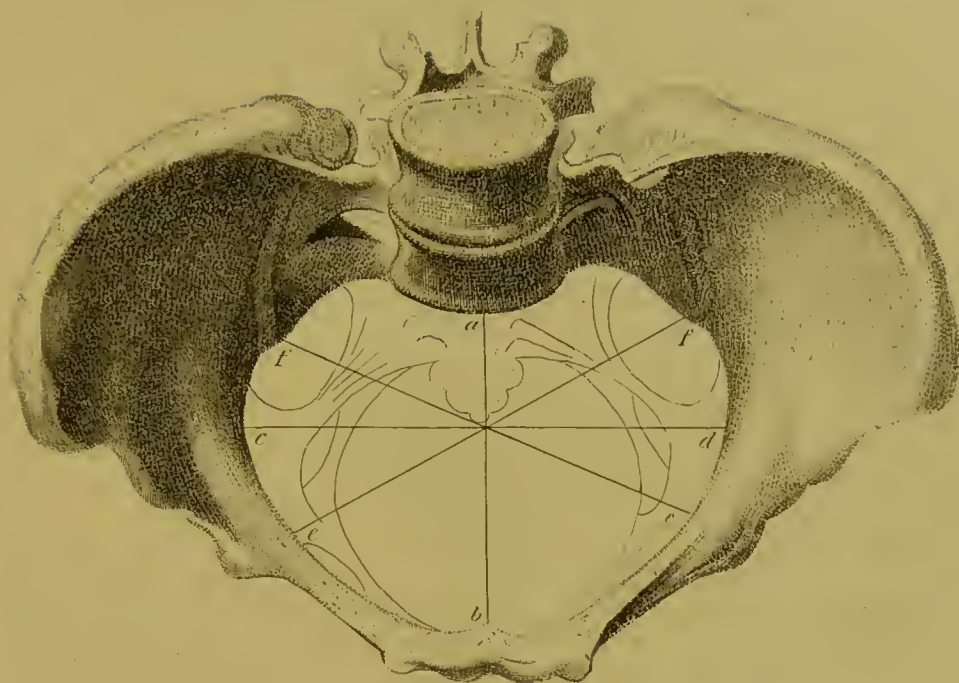


Fig 2

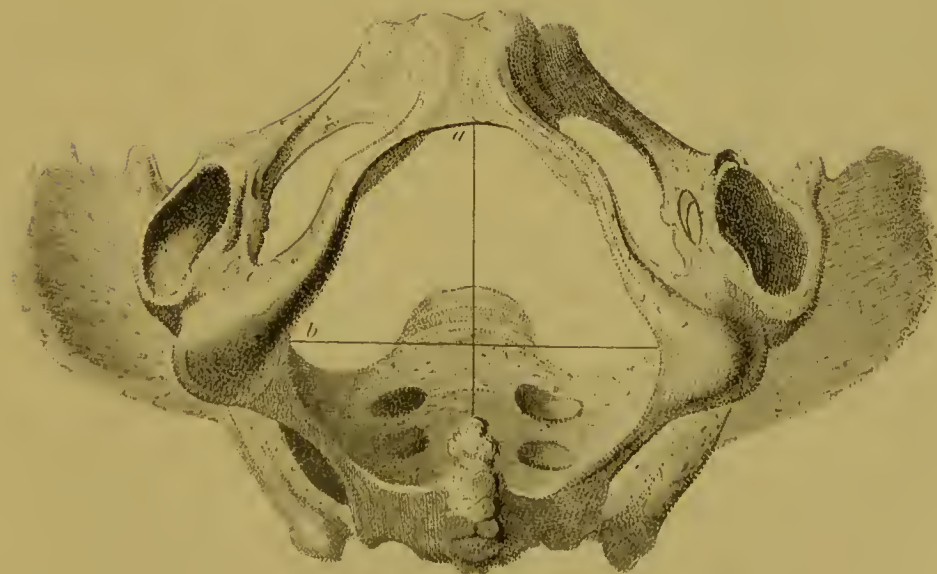


Fig. 1.



Fig 2

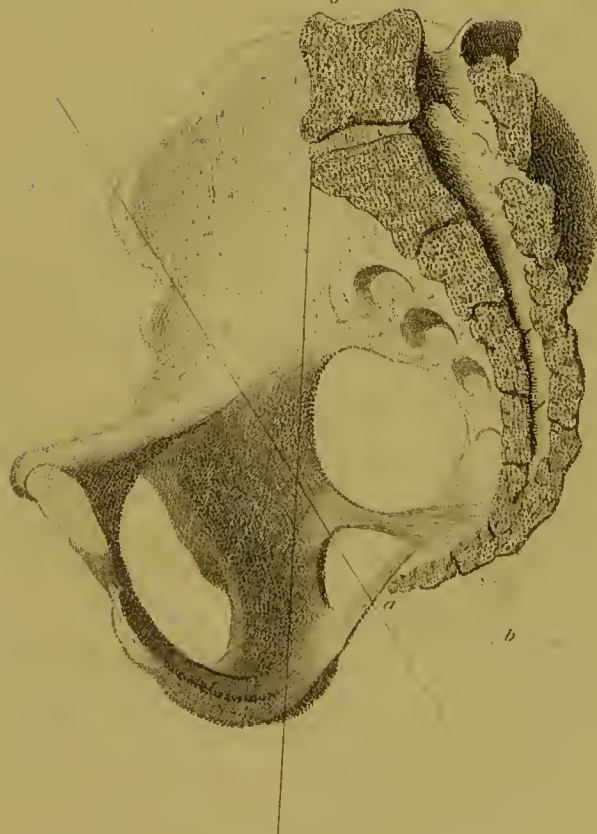


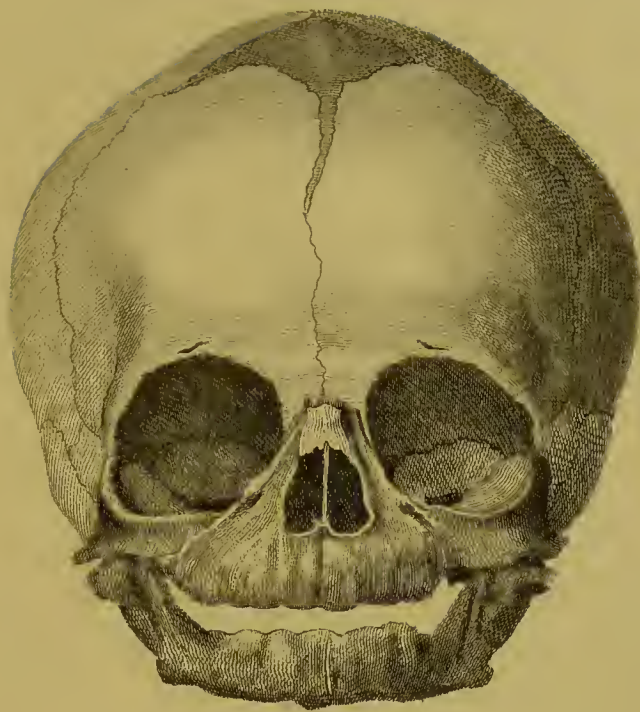
Fig. 1.*Fig. 2.*

Fig 1.

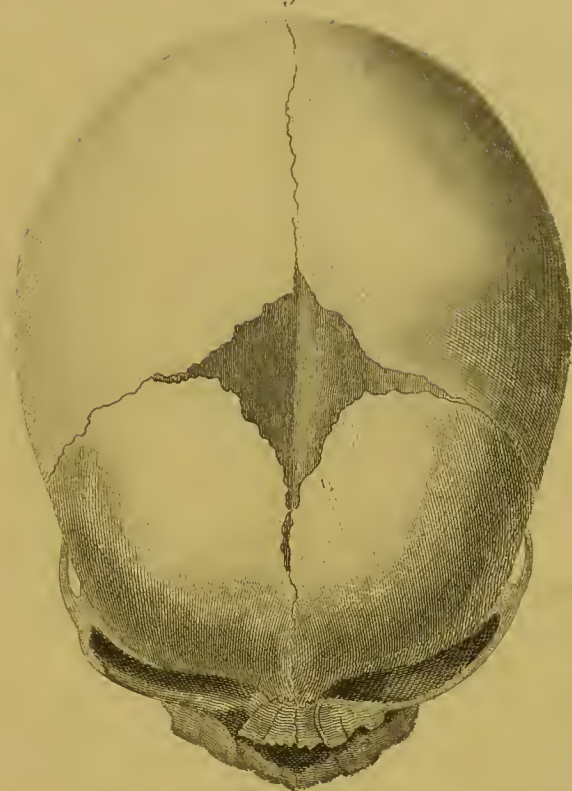
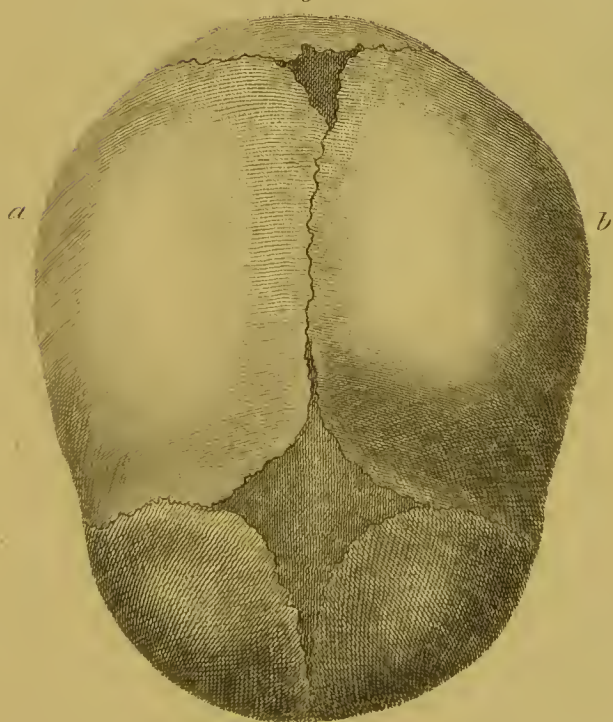
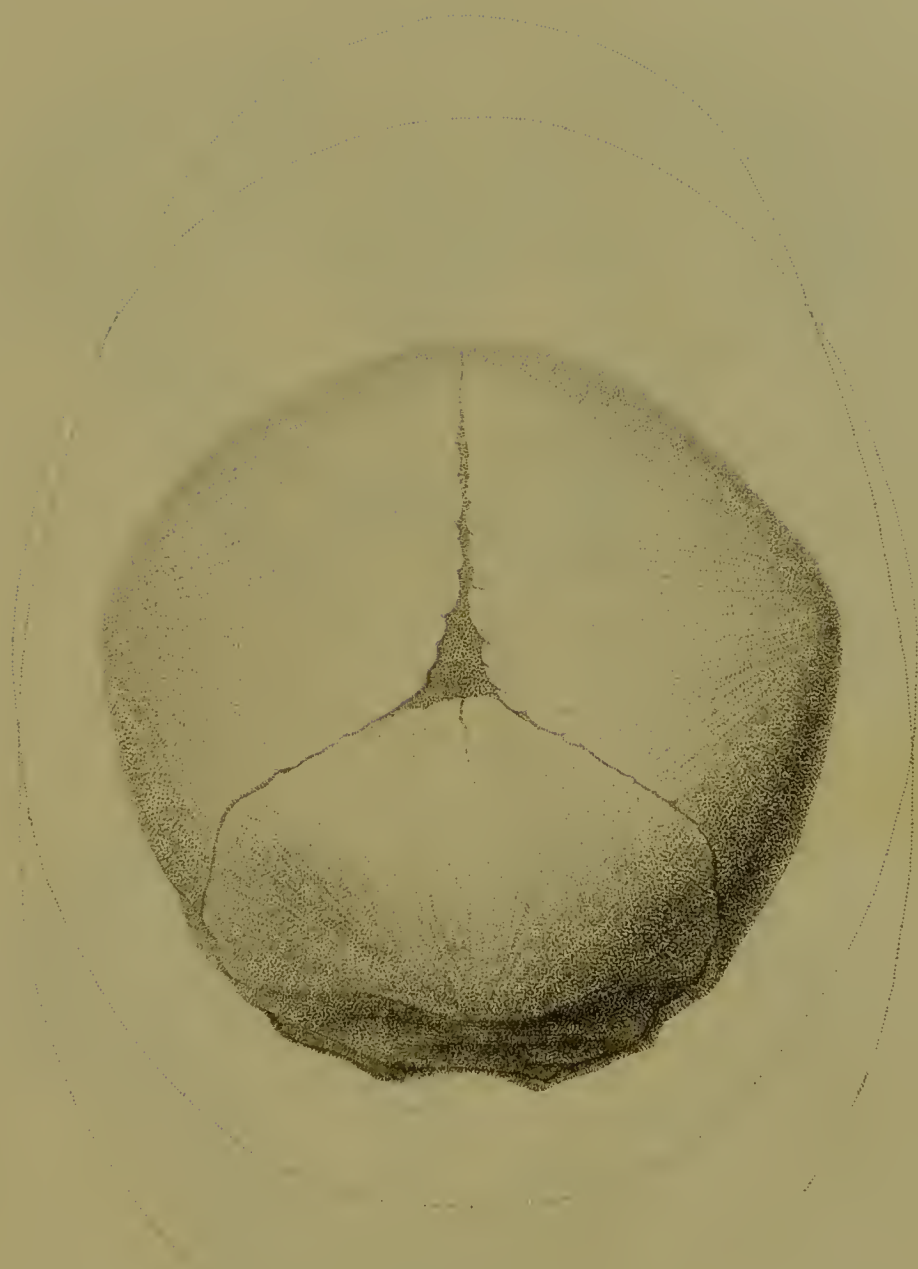
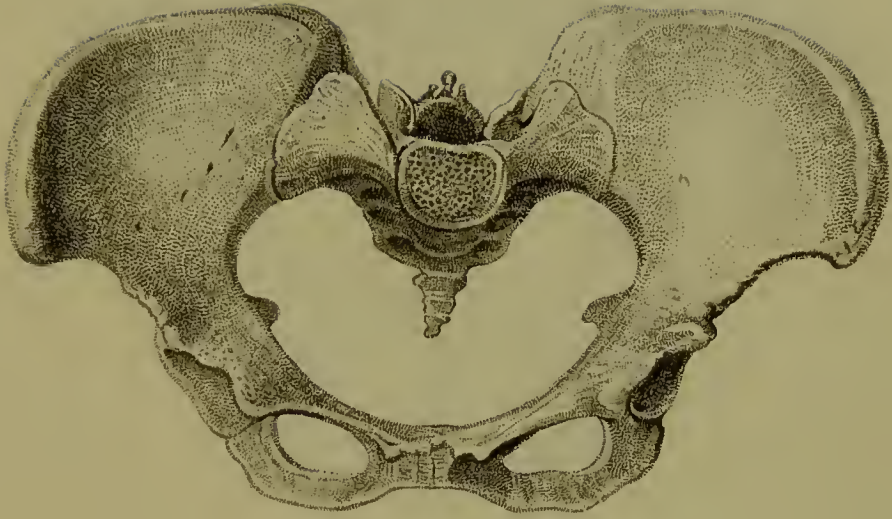


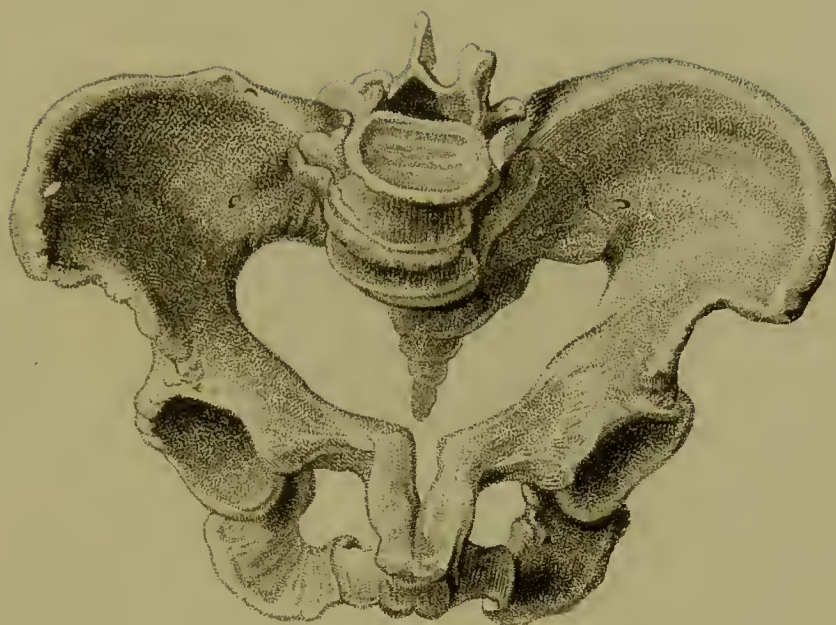
Fig 2.







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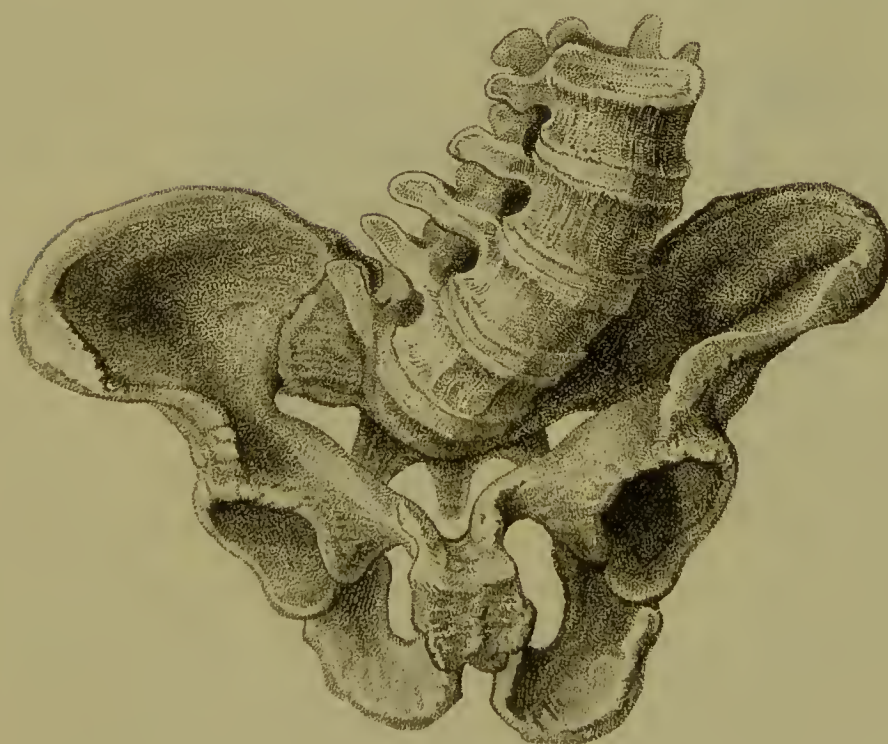




FIG. 1

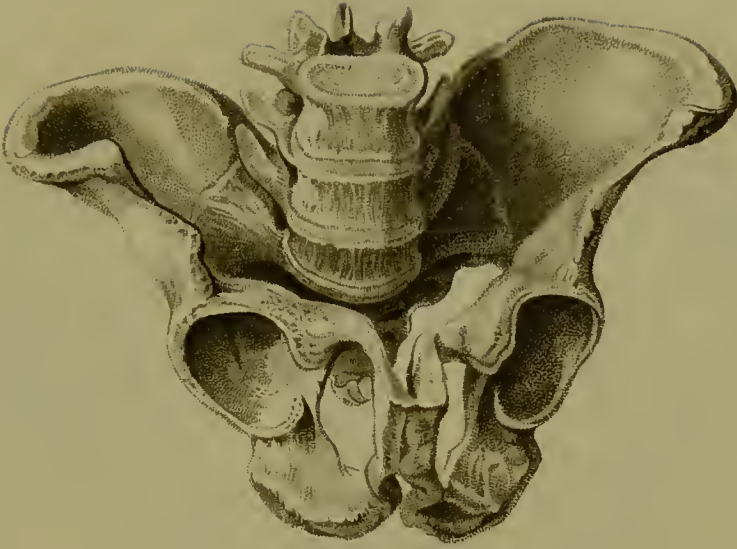
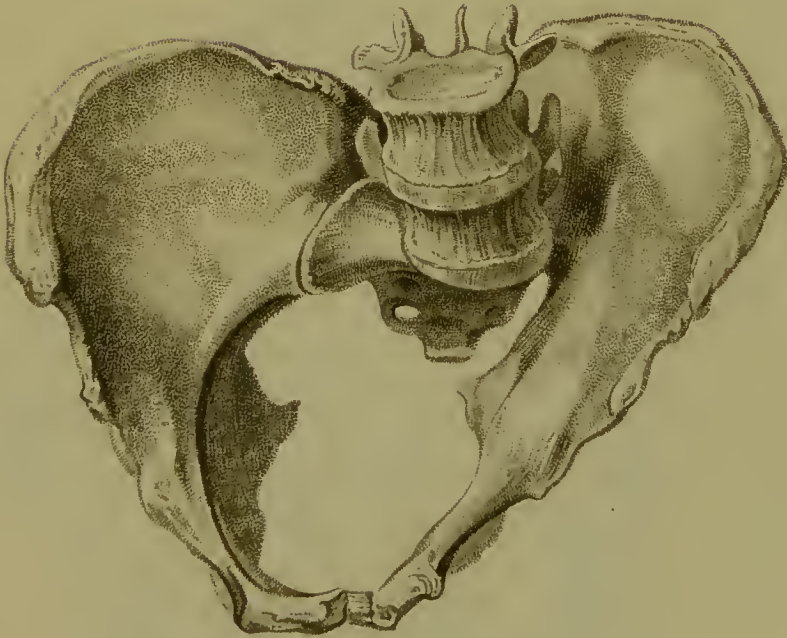
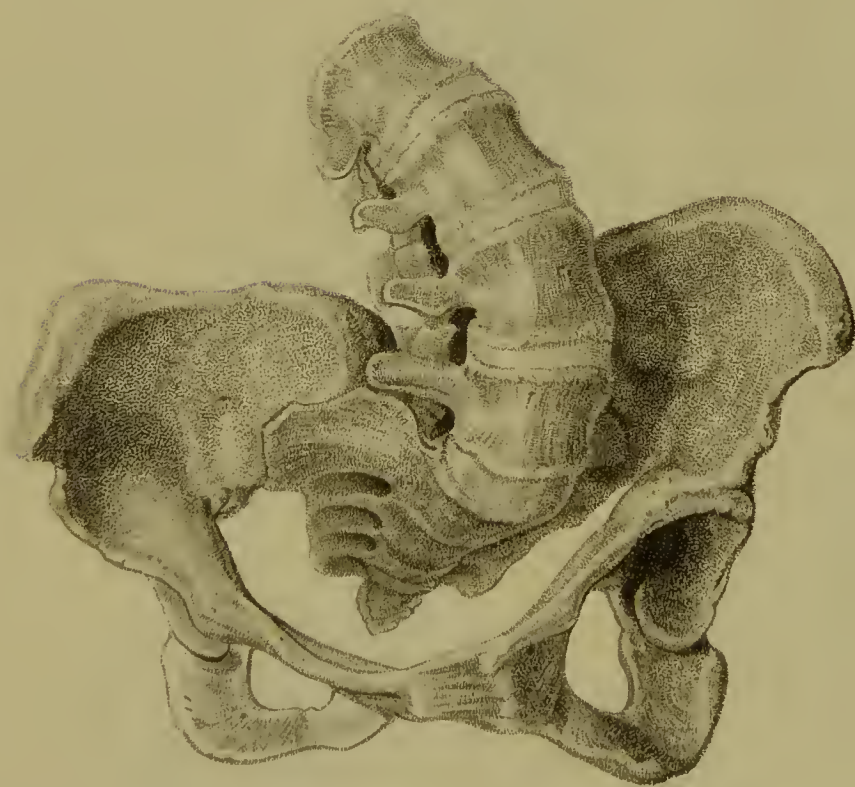
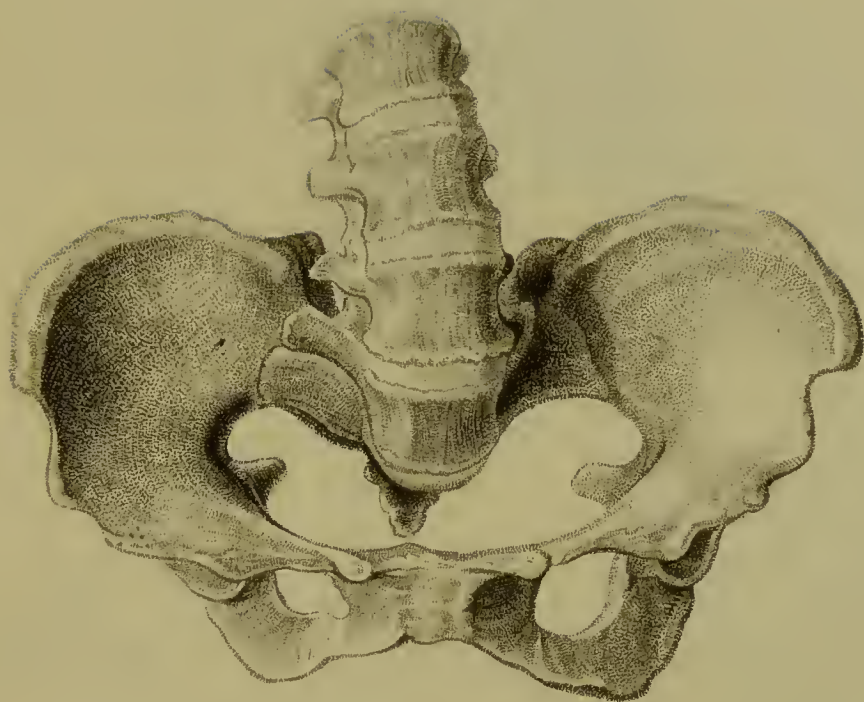
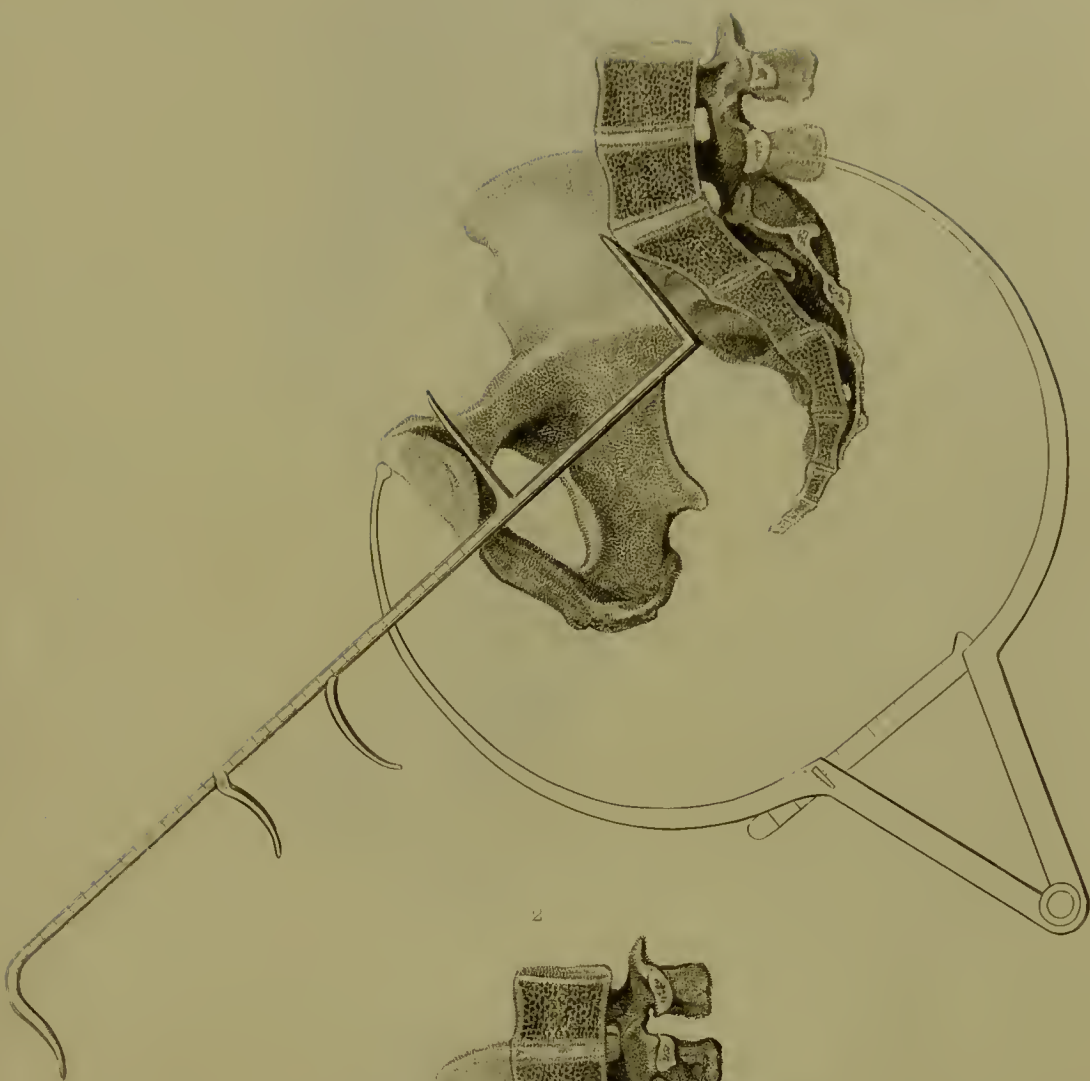


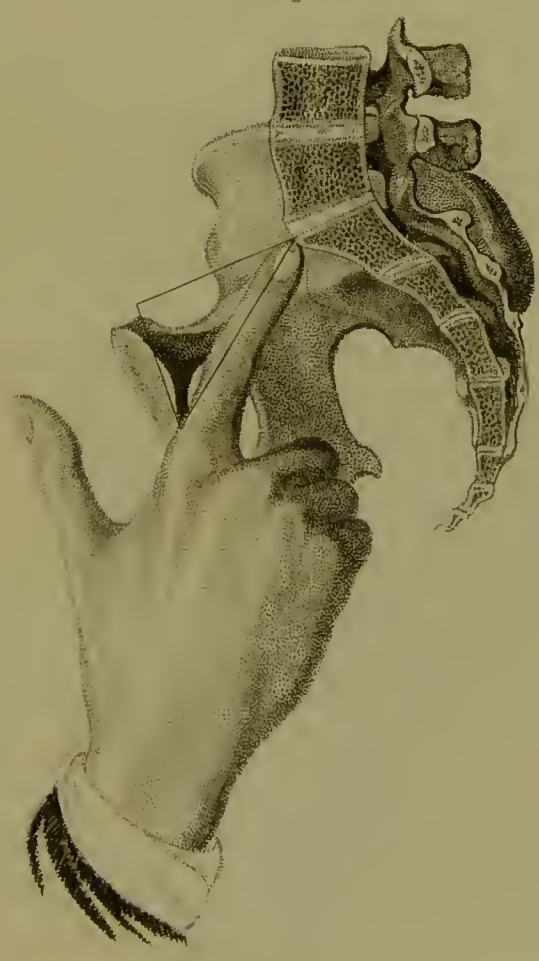
FIG. 2

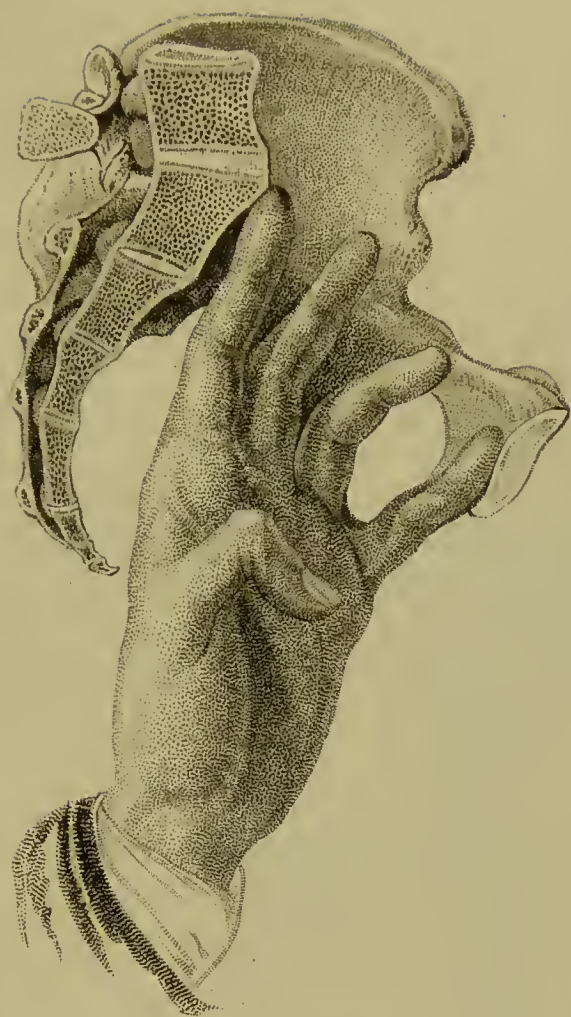


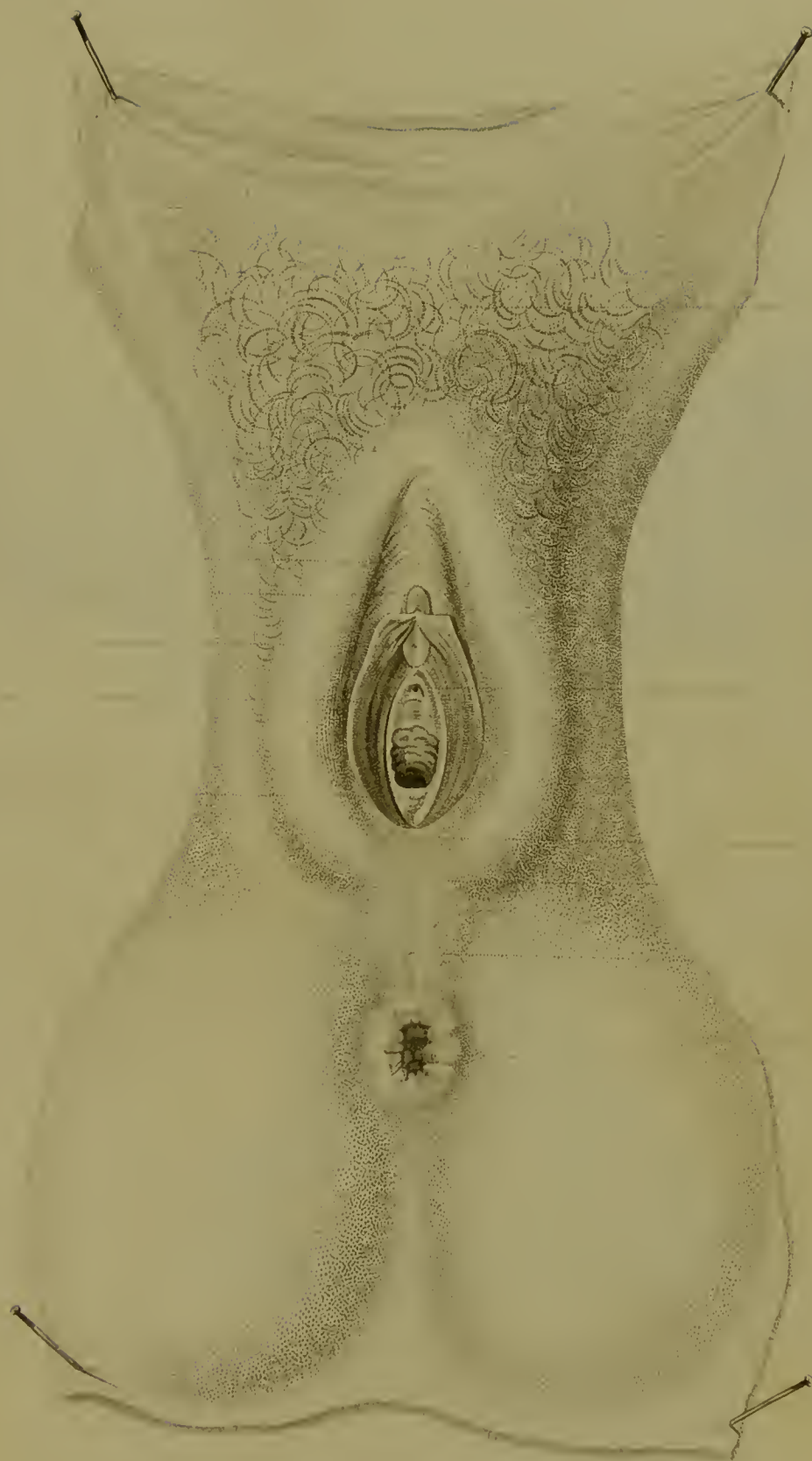




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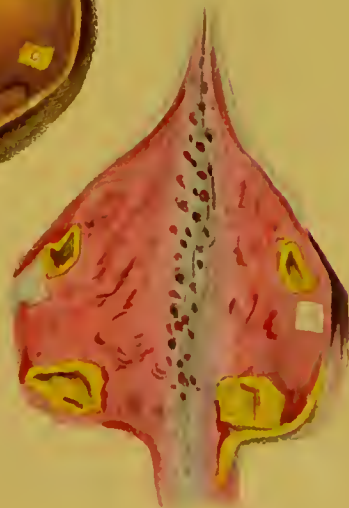
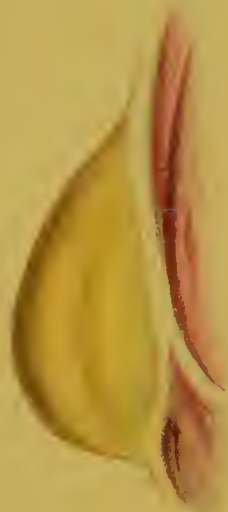


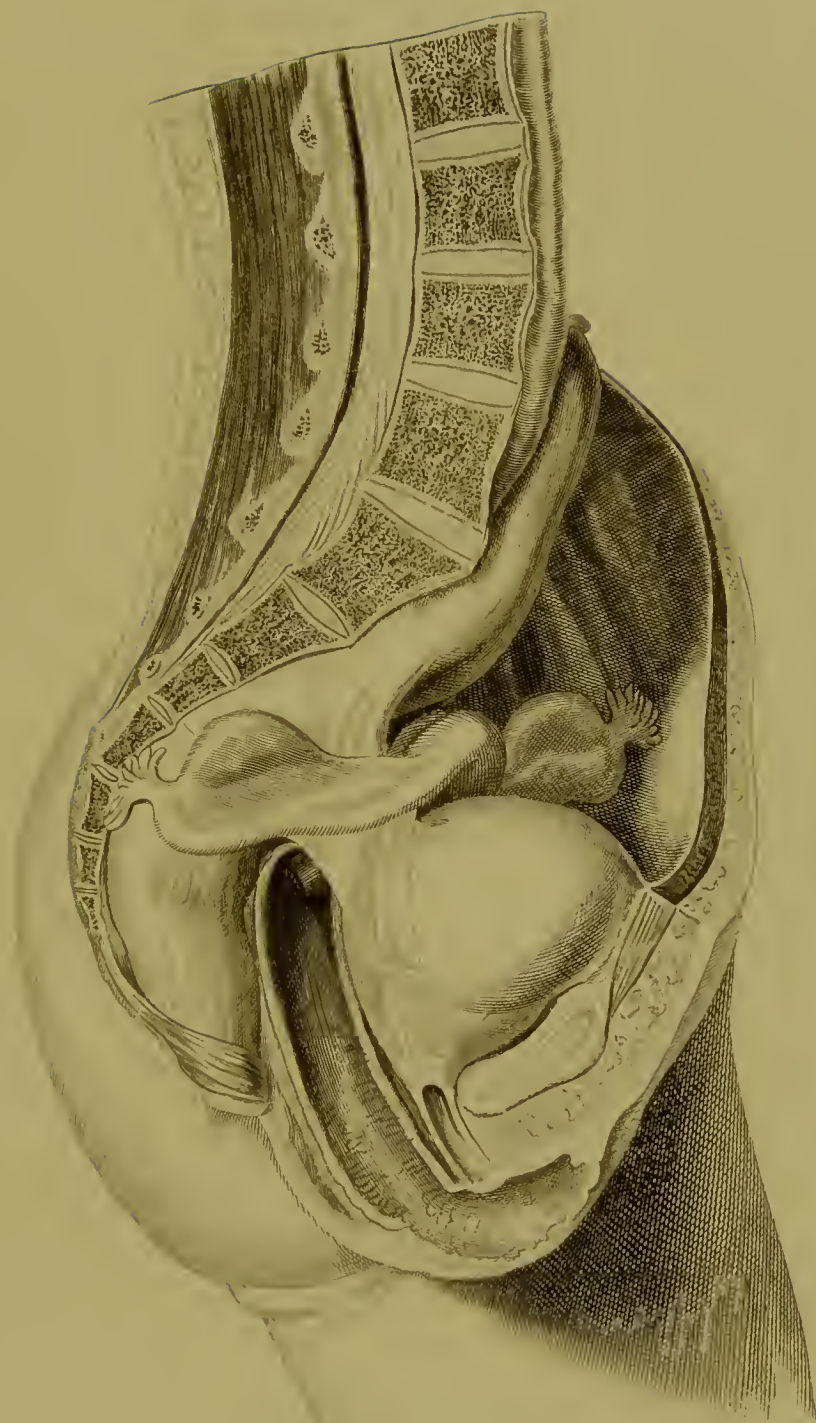








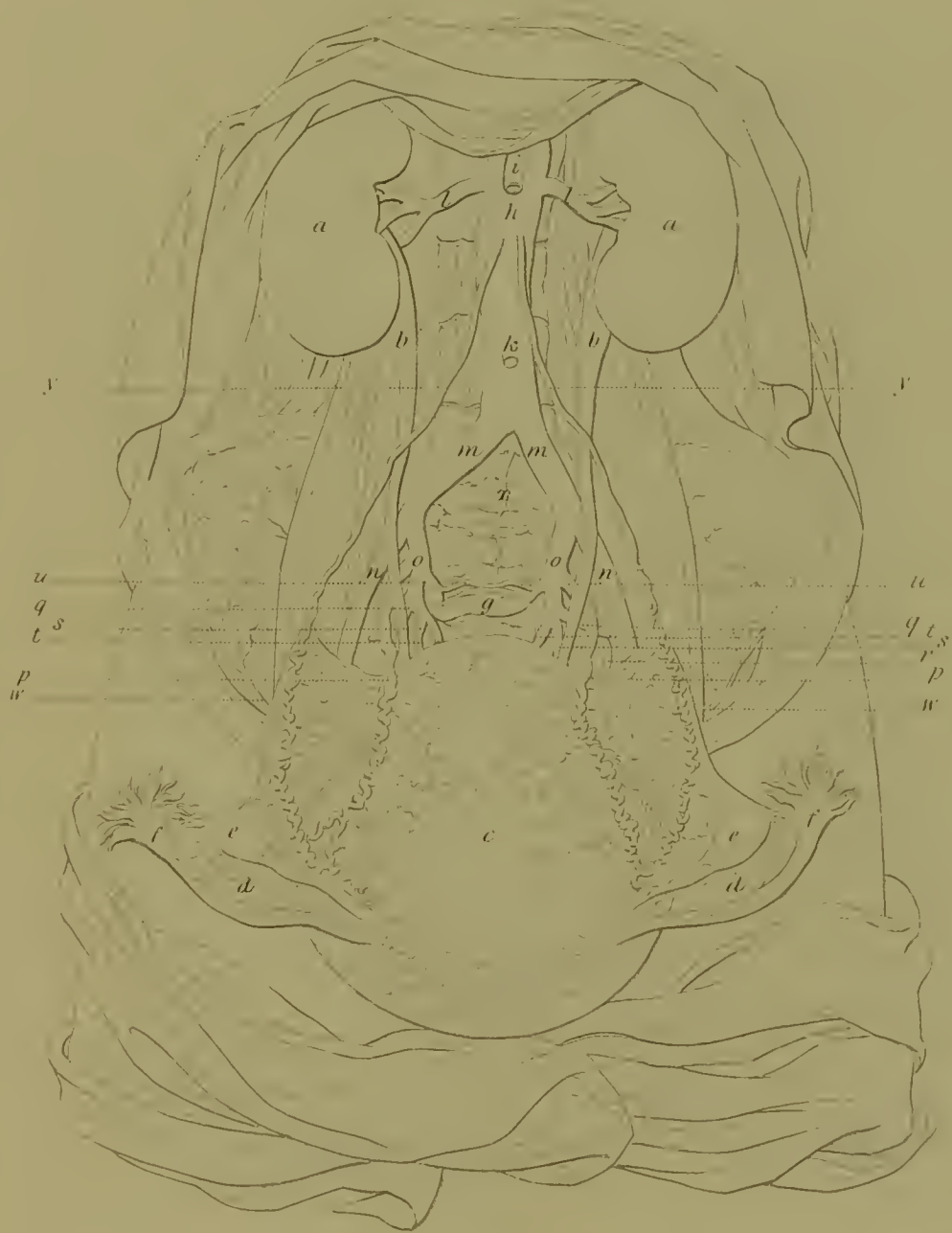


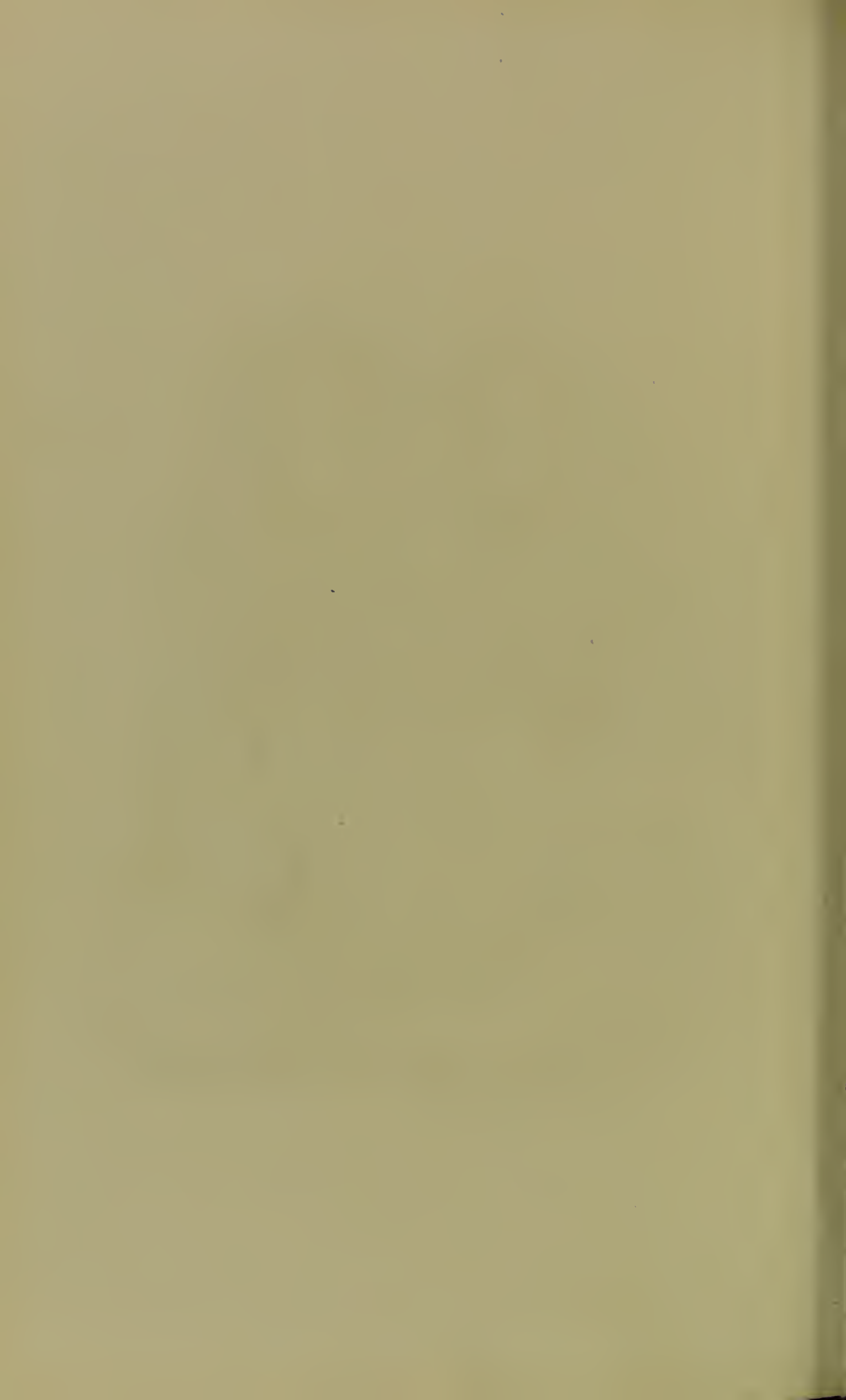


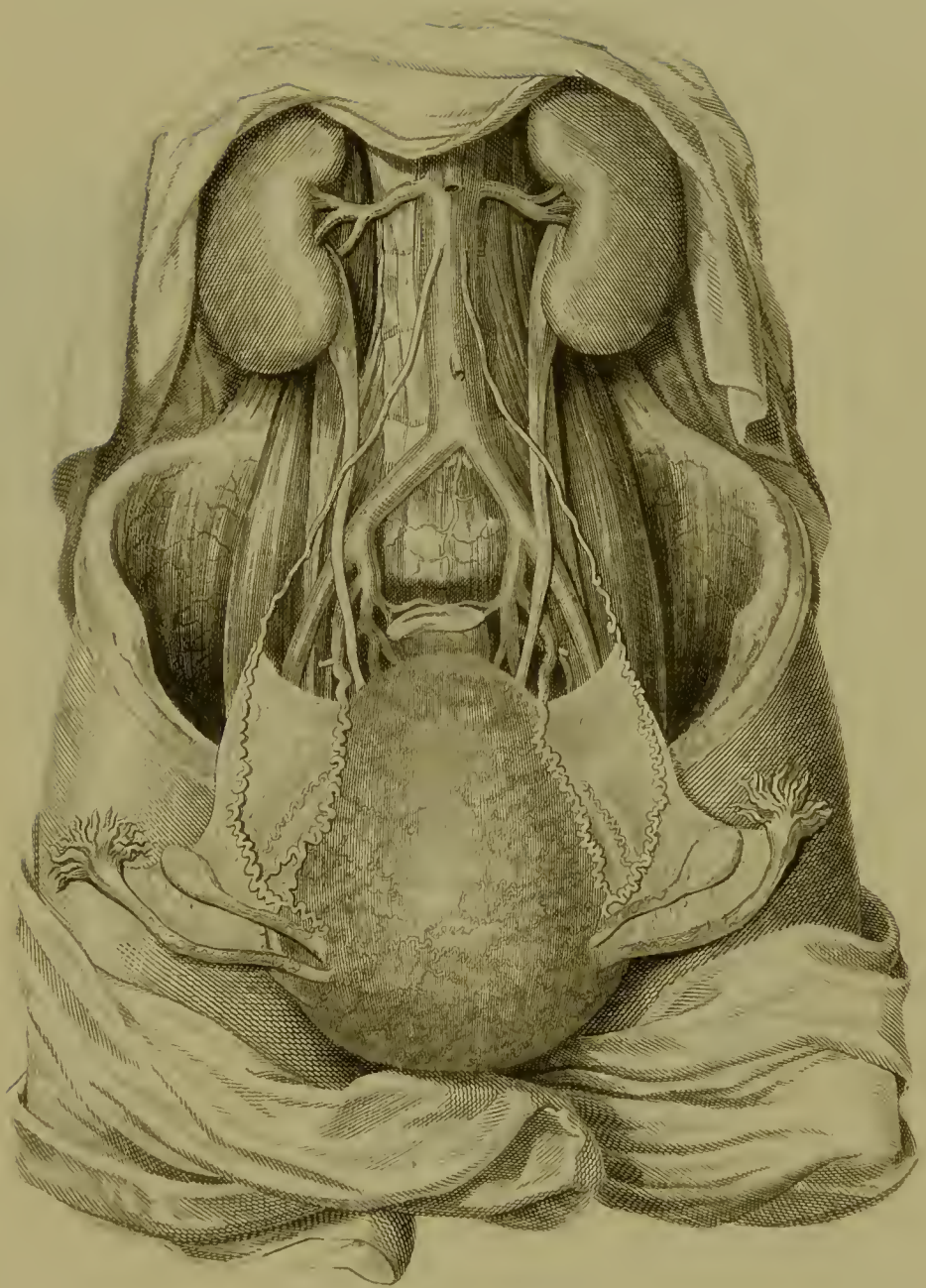


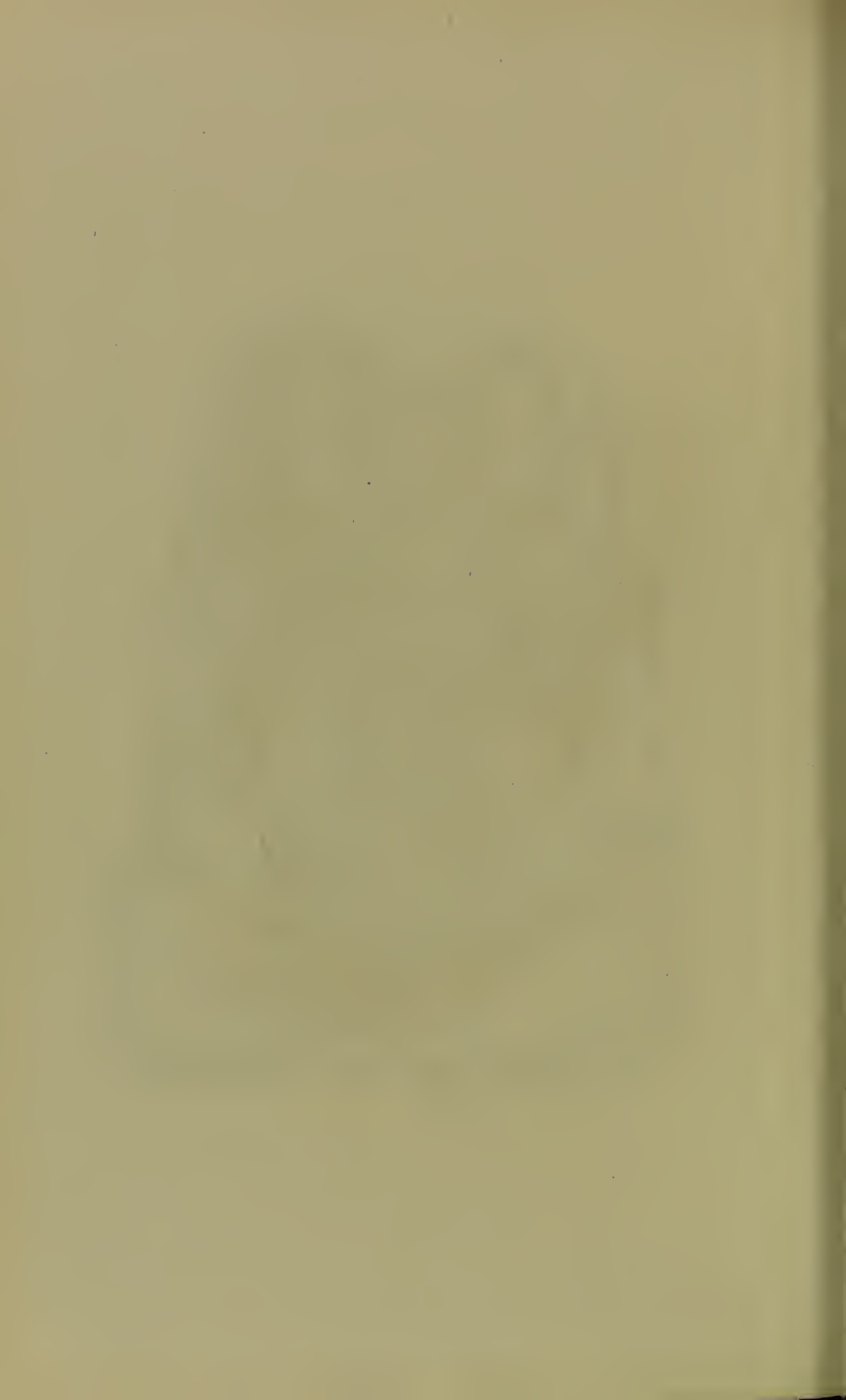














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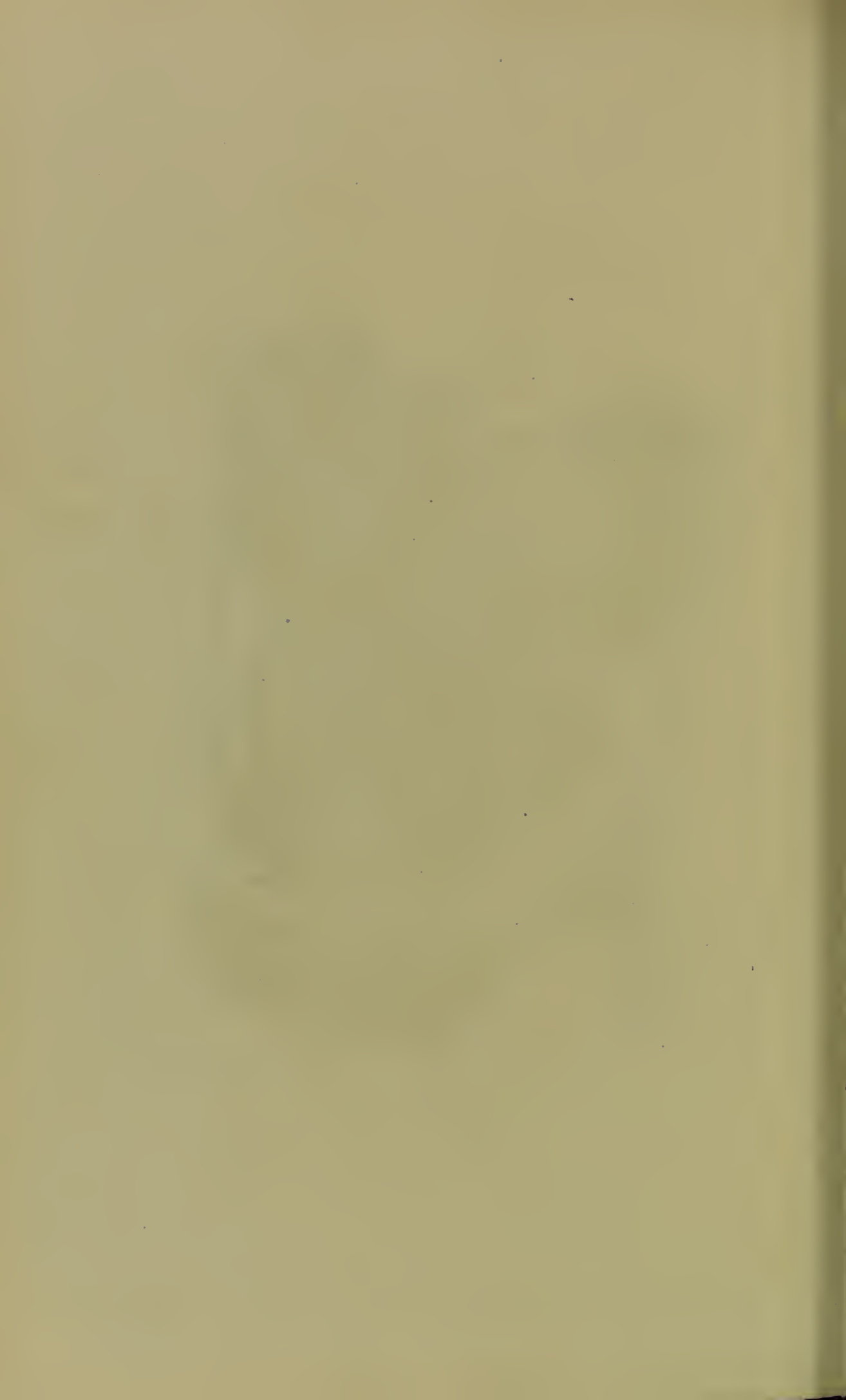


Fig 1



Fig 2

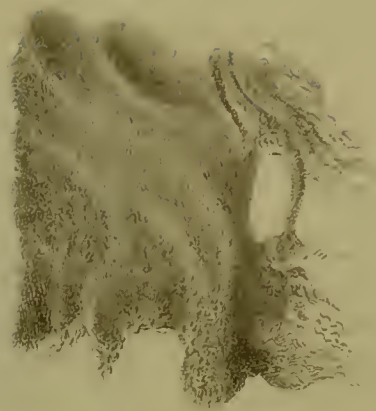
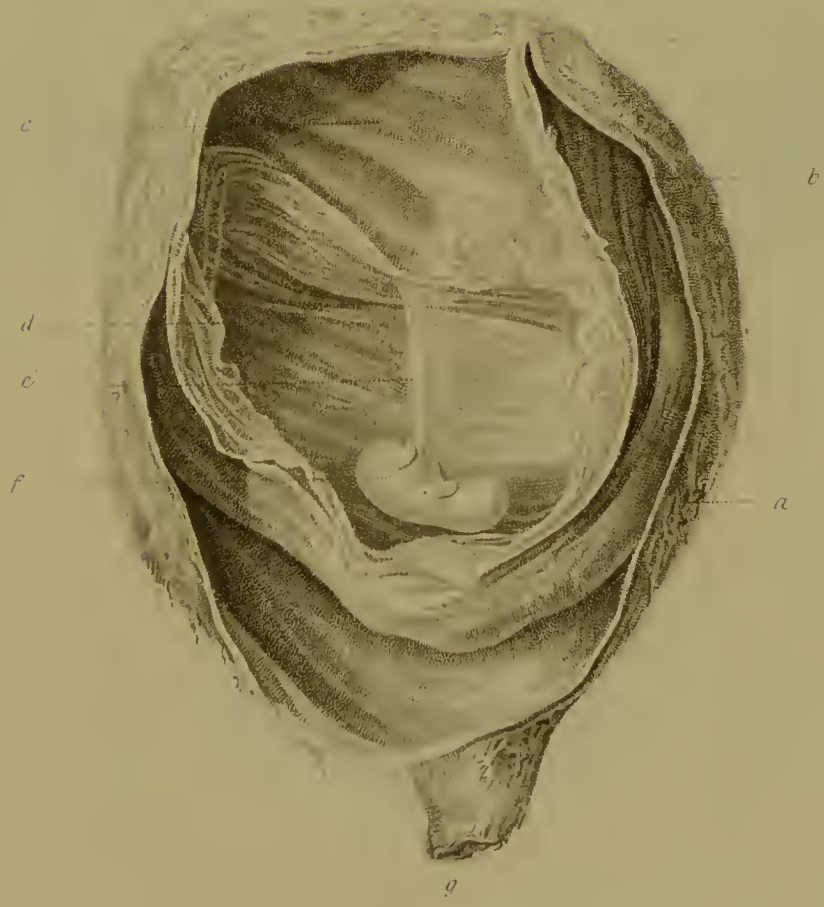


Fig 3



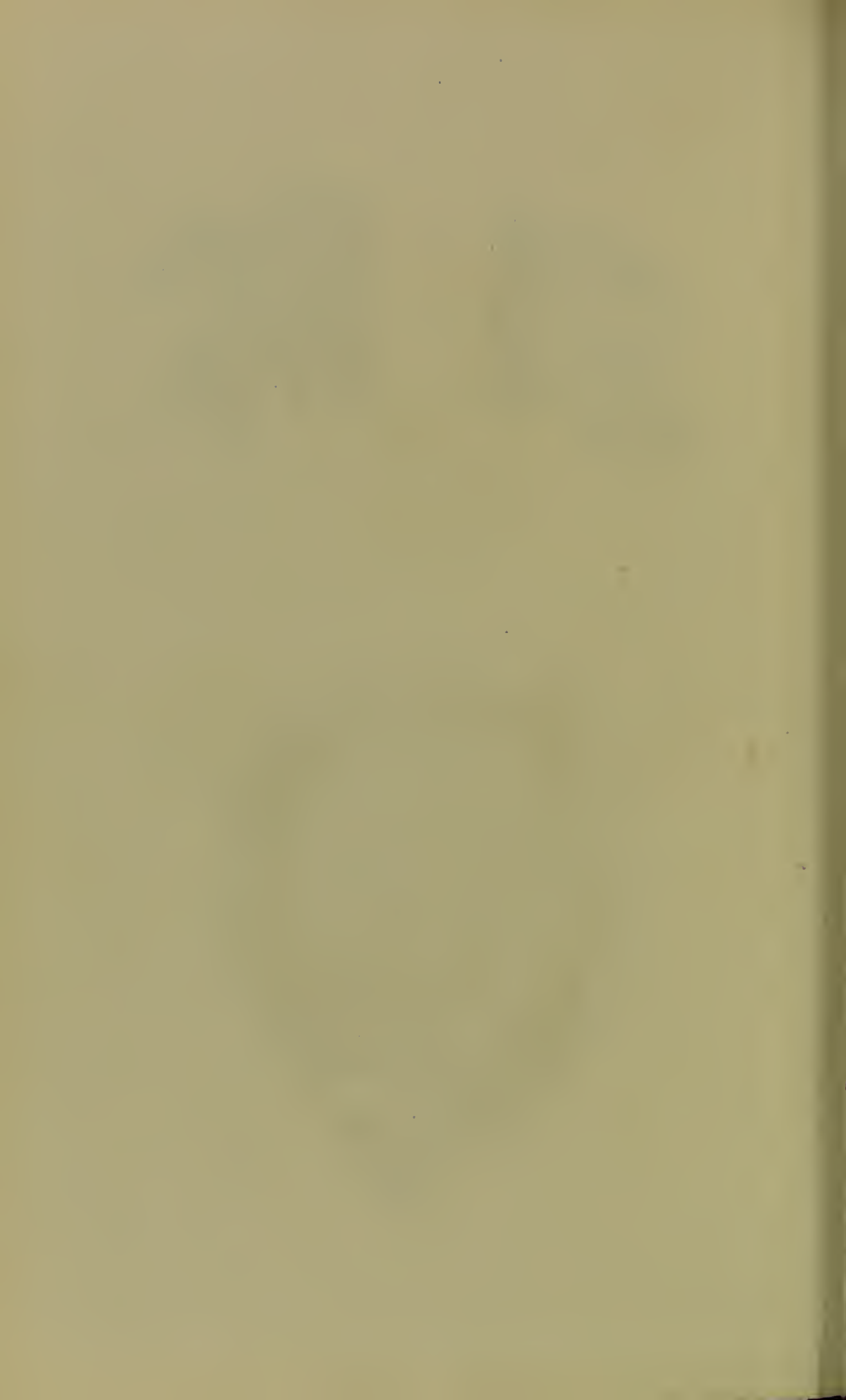


Fig. 1.



Fig. 1.



Fig. 2.

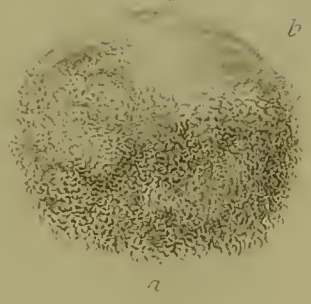
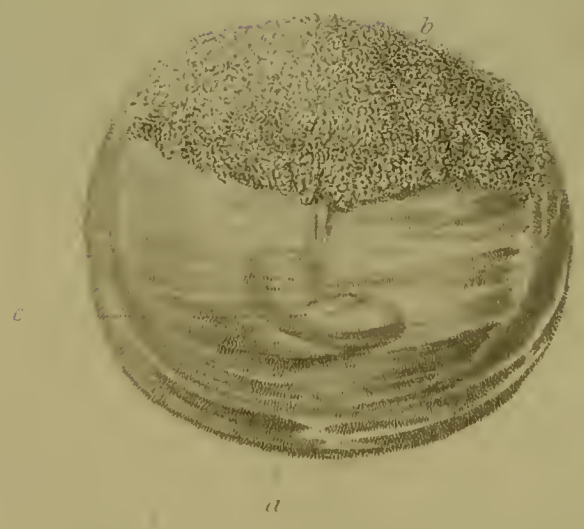


Fig. 3.









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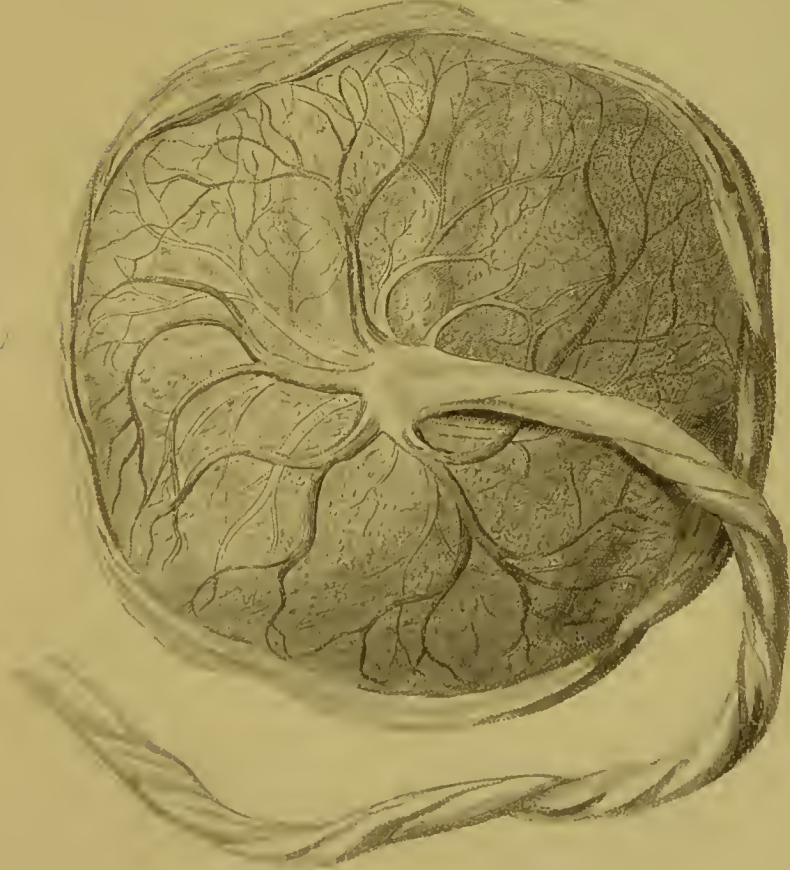


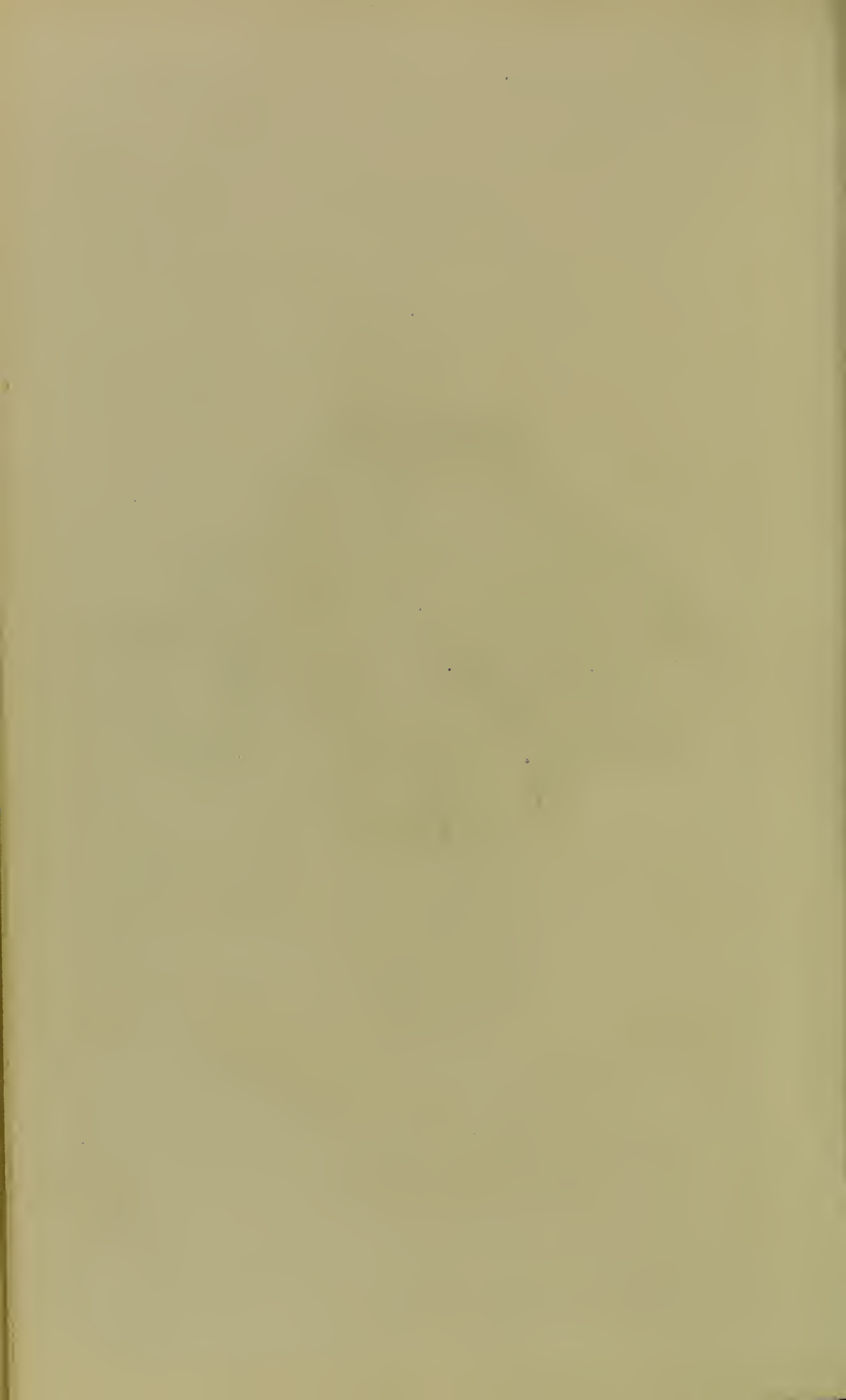


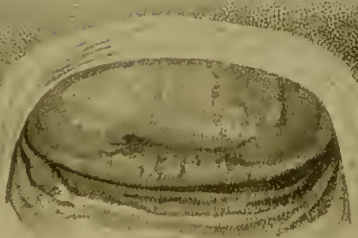
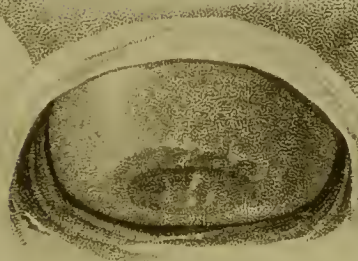
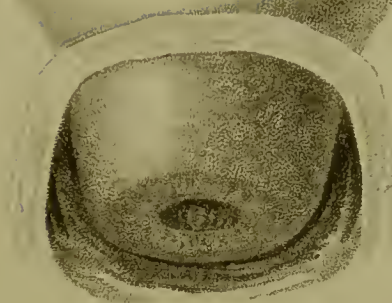
Fig 1.

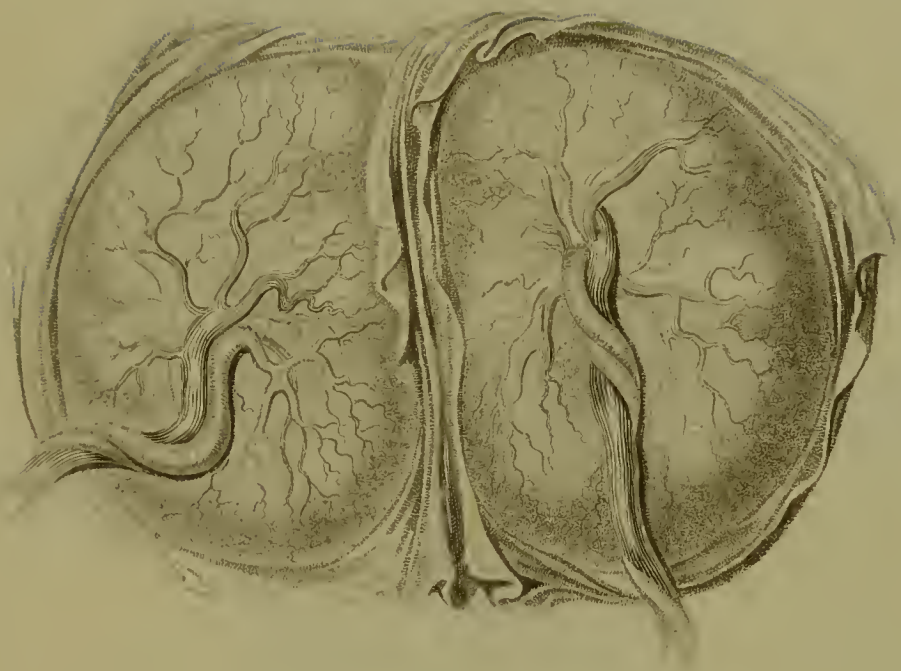


Fig



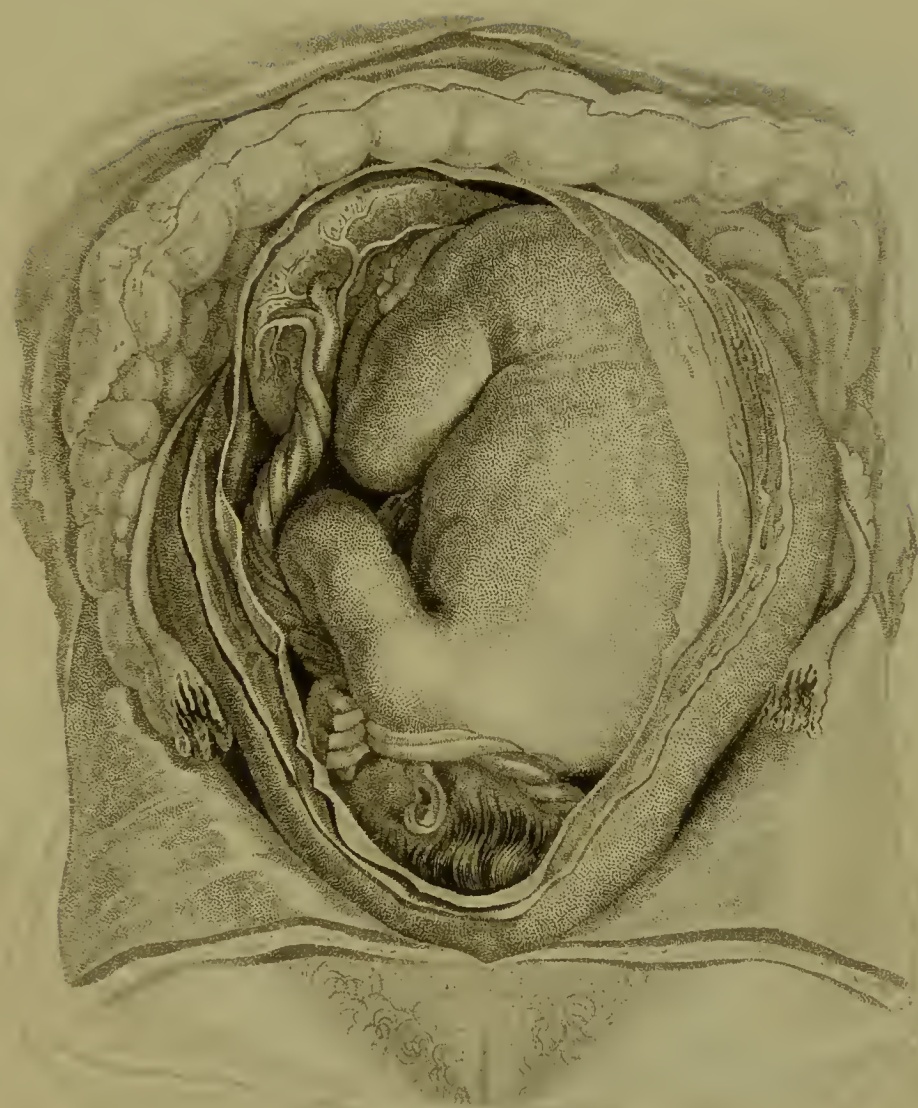


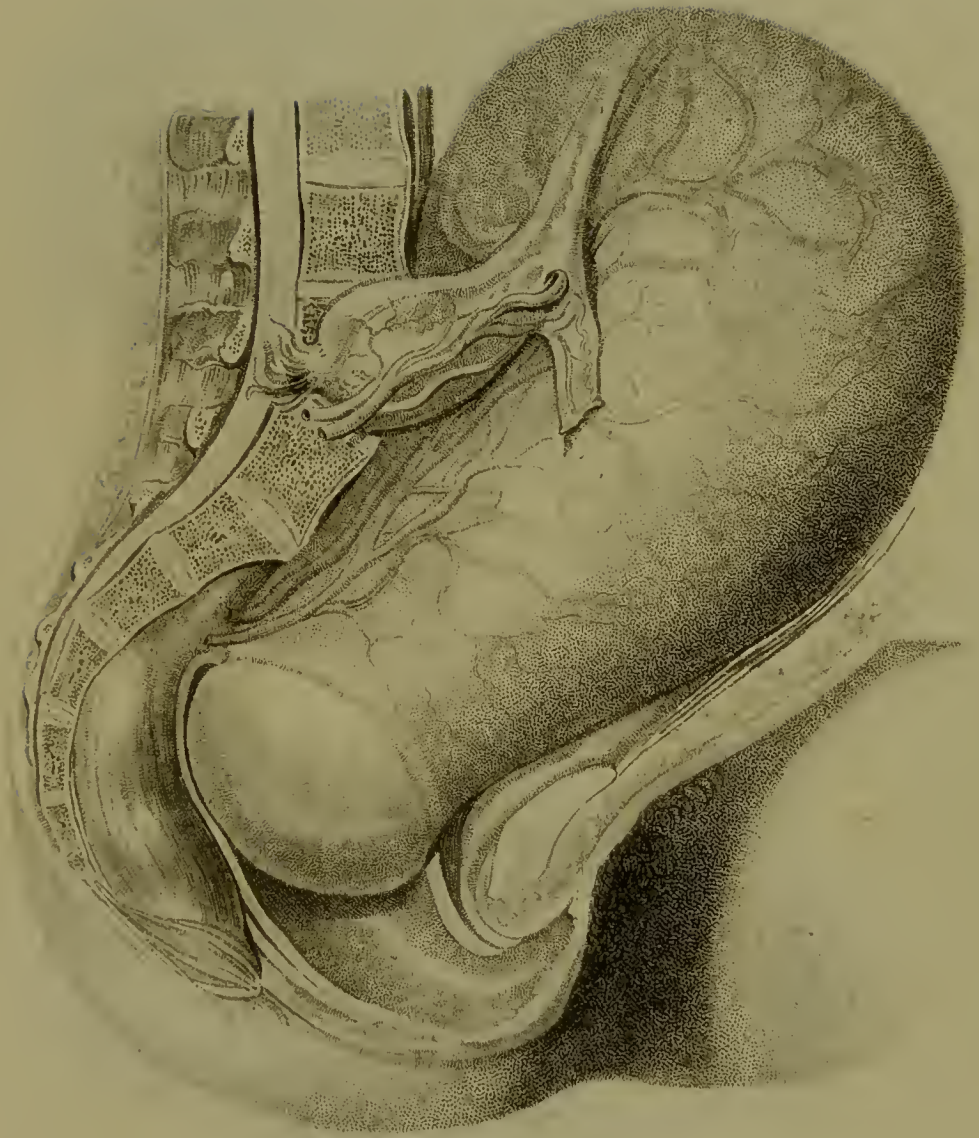












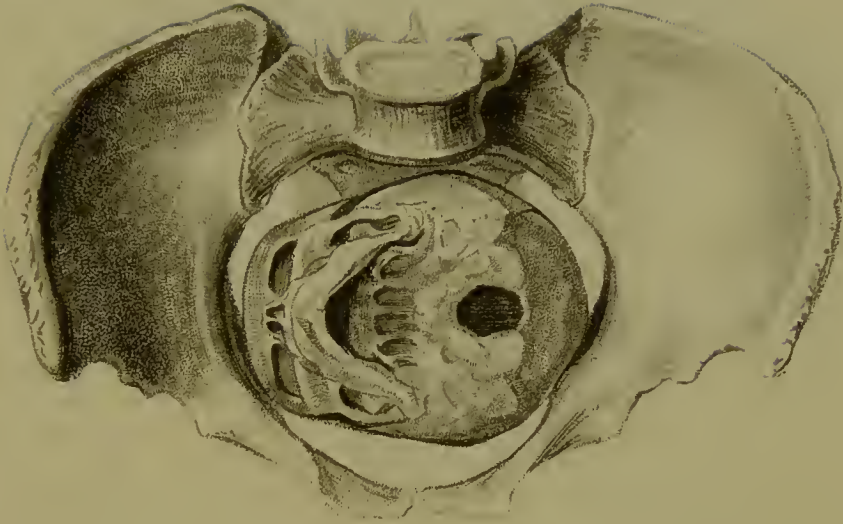
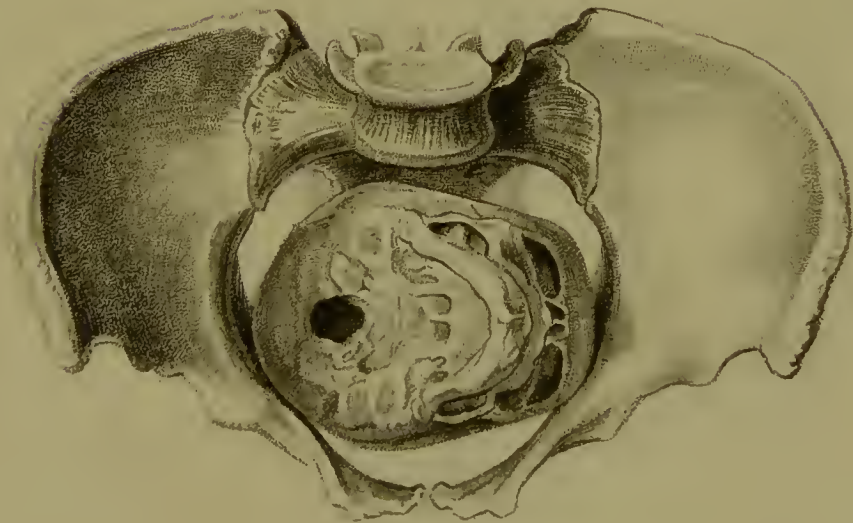
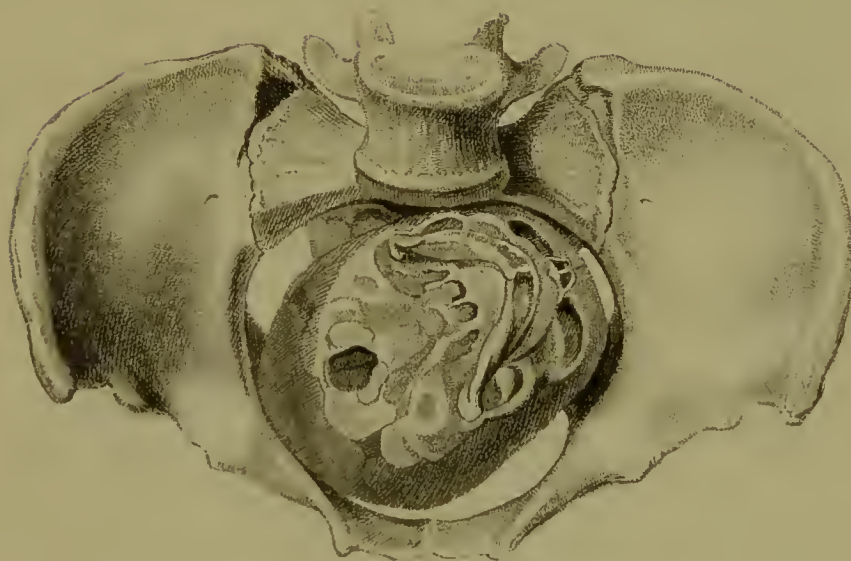
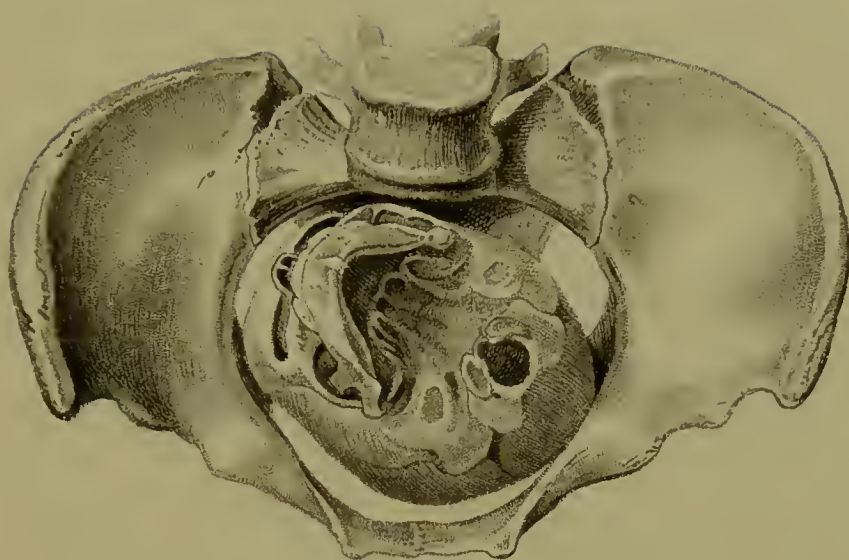
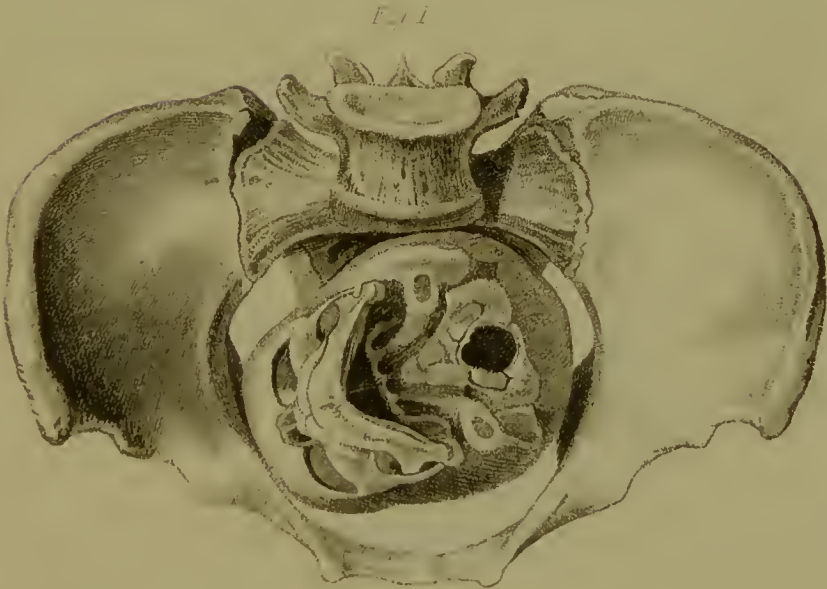
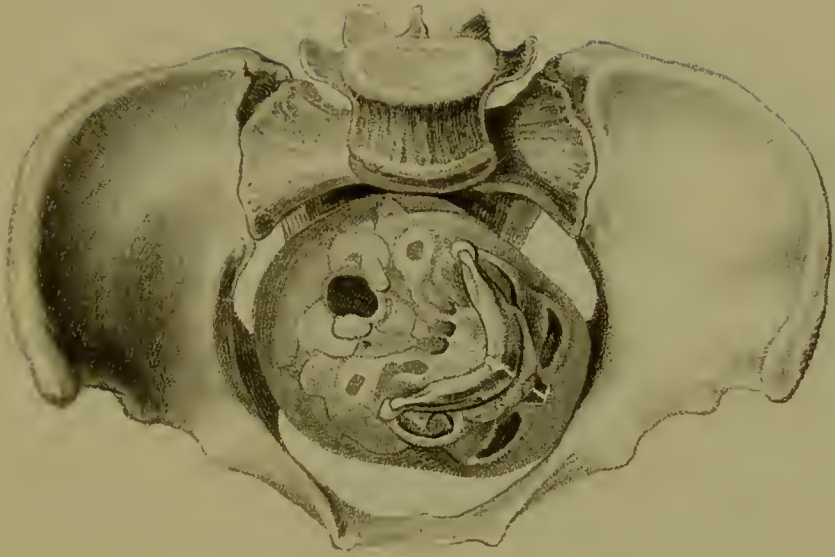


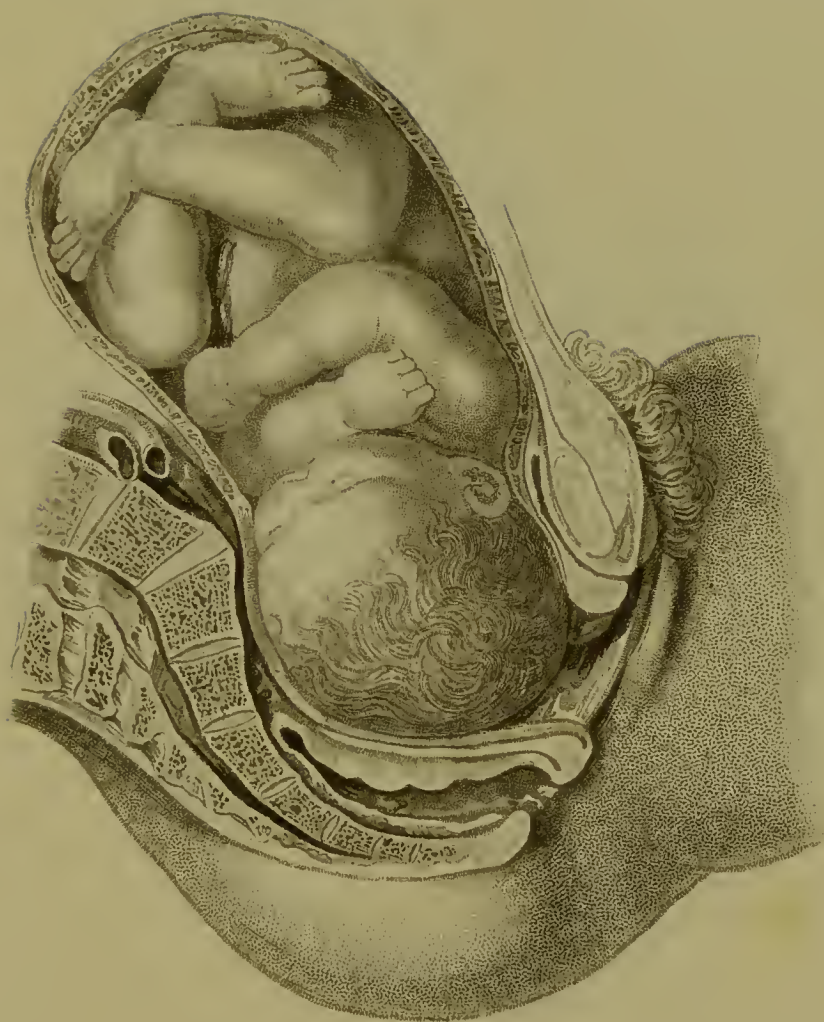
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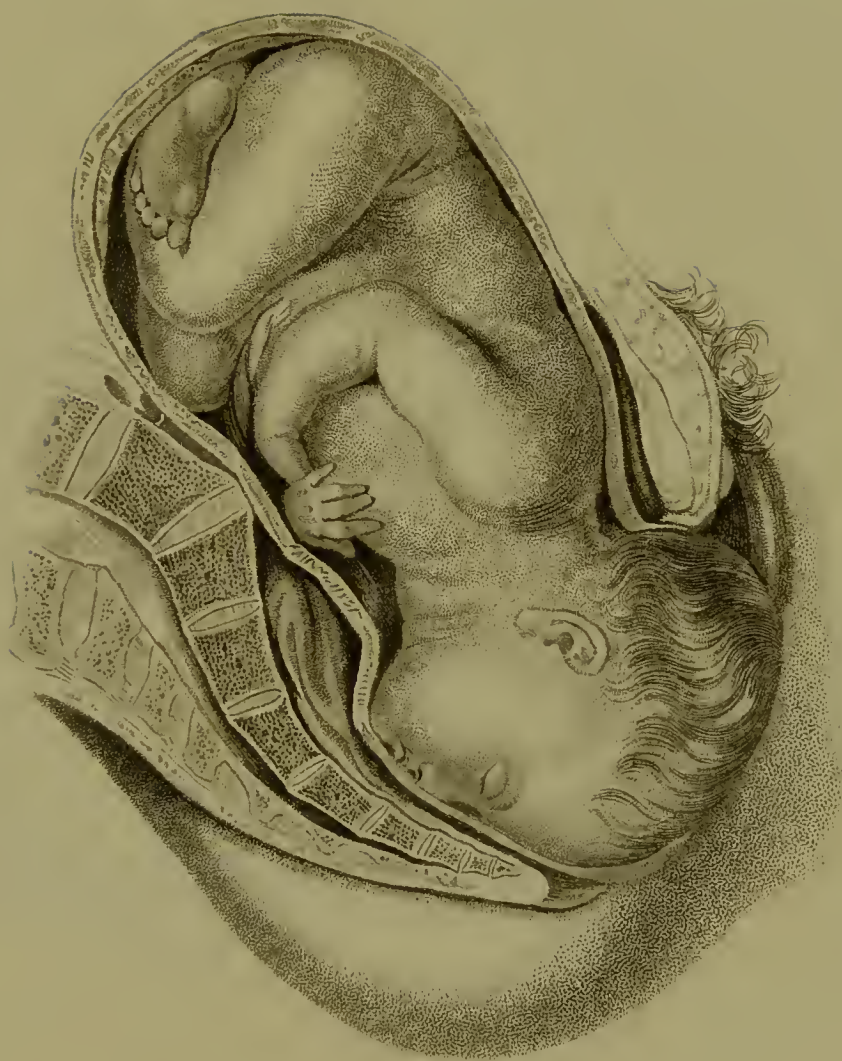














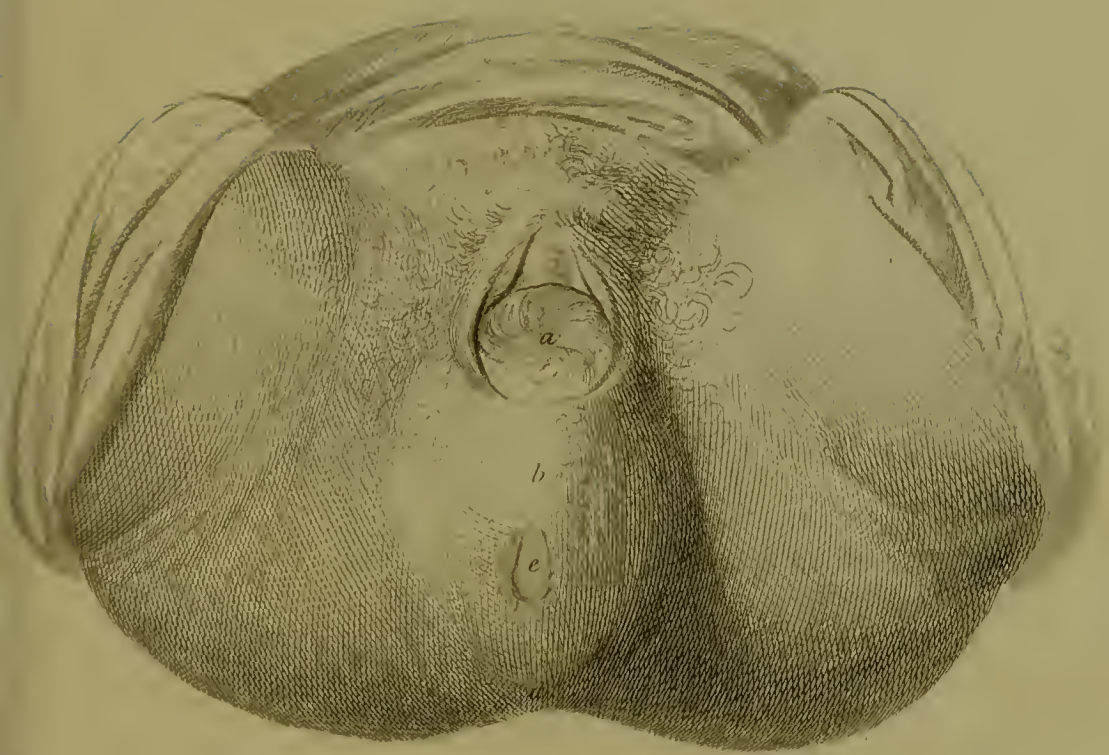




Fig. 1.



Fig. 2.

